ANNALS
OF THE
CAPE PROVINCIAL
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Ann. Cape Prov. Mus.

VOLUME III • AUGUST 1963

PUBLISHED JOINTLY BY THE
CAPE PROVINCIAL MUSEUMS AT THE ALBANY MUSEUM, GRAHAMSTOWN
SOUTH AFRICA

CAPE PROVINCIAL MUSEUMS

South Africa

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With the Compliments of

the Director and Staff

Albany Museum,

Grahamstown

Met die komplimente van

die Direkteur en Staf

Albanie-Museum,

Grahamstad

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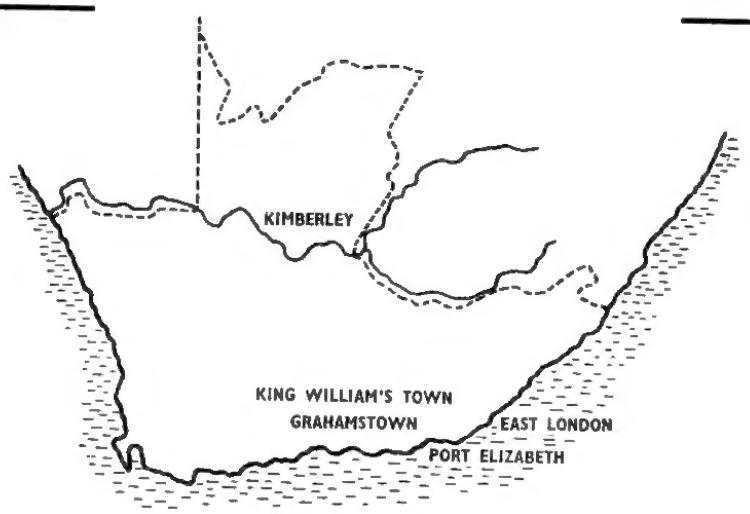

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The Annals of the Cape Provincial Museums are published jointly and annually by the five Cape Provincial Museums situated at East London, Grahamstown, Kimberley, King William's Town and Port Elizabeth. The editorial headquarters are at the Albany Museum, Grahamstown. The Journal is intended to record the results of research in the fields of pre-history, cultural history and natural history.

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Contents

R. A. JUBB, B.Sc.

ALBANY MUSEUM.

A Revised List of the Freshwater Fishes of Southern Africa.

(*Accepted 1st June, 1962*)

SUMMARY

A check list of the freshwater fishes of Southern Africa has been compiled from recent research and current literature. Distribution tables for three regions covering the Cape Province to the Zambezi River are provided.

A REVISED LIST OF THE FRESHWATER FISHES OF SOUTHERN AFRICA.

This revised list, which is a provisional balance sheet of the taxonomic position to date, has been prepared from recent literature (Barnard 1943, 1948, Groenewald 1958, Crass 1960), research carried out personally in the field and in the laboratory, and collaboration with fish biologists working on similar problems. It covers the same area as that adopted by Gilchrist and Thompson, 1913, 1917, and has been based on this work, as well as that of Boulenger, 1909—1916, for all references prior to 1918. As a number of original descriptions of species have been altered by these latter three authors it has been necessary to refer to original descriptions in previous literature.

Although the collection of new material from most of the major rivers from the South-west Cape to the Zambezi resulted in a considerable amount of travelling, the study of fresh specimens in the field proved most valuable. It has been necessary to examine type specimens and collections in the South African Museum, the Transvaal Museum and the National Museum in Bulawayo, as well as certain species in collections maintained by the Provincial Fisheries Institute, Lydenburg, and the Natal Parks, Game and Fish Preservation Board's Fisheries Research Officer in Pietermaritzburg. Fresh material has also been supplied by these two research centres as well as by the Joint Fisheries Research Organisation and the Fish Culturist of Northern Rhodesia, the Biologist of the Kruger National Park, the Veterinary Department of Swaziland and Mr. Paul Scheide of Windhoek. This latter gentleman supplied specimens from the Okavango swamps, which, under ordinary circumstances would have been most difficult and costly to obtain—some were transported by air to Grahamstown alive. In cases of doubt fresh material has been sent to London for direct comparison with type material housed in the British Museum (Natural History). Some of Peters' species have remained obscure ever since they were described in 1852, and, by courtesy of the Berlin Museum, they were posted to me in Grahamstown where I was able to examine them and establish their validity.

Taxonomic Characters

The sampling of natural populations has always been a problem, and, after studying several long series of specimens of different species, it can be confirmed that adequate sampling is necessary in order to cover, as far as possible, individual variations within a population. When dealing with original descriptions based on single specimens, quantitative data has been found to be misleading, particularly so when the type specimen was immature. When determining a species from inadequate material quantitative data should be used in conjunction with ecological characters and the geographical position of the origin of the specimens being examined. On paper it would appear that two species such as *Barbus afer* and *Barbus asper* can be separated quite easily, but, from the examination of long series of both species it has been found that a small percentage of individuals actually overlap. Thus, without knowing the river system from which these particular specimens came, the taxonomist would find it difficult to determine the species on purely quantitative characteristics.

A characteristic of *Barbus marequensis* and *Barbus natalensis* is the adaptation of the mouth (du Plessis, 1956, Groenewald, 1958, Crass, 1960). In a natural population of either of these species it is possible to find specimens with thick rubber-lips, normal mouths, or wide *Varicorhinus*-like mouths, as well as a host of intermediate stages. This *Varicorhinus*-like mouth has not been found in specimens of *Barbus capensis*, *B. holubi*, *B. kimberleyensis* and *B. polylepis* although rubber-lip varieties are common. This was particularly well demonstrated in a collection of *Barbus* from the Marico River (Limpopo system) which was forwarded by the Provincial Fisheries Institute, Lydenburg. The fish came from the same pool and represented two species, *B. polylepis* and *B. marequensis;* only the latter specimens had the wide square mouth with sharp cutting edge to the lower jaw. Until more is known about this variation in the development of the mouth the ability, in the case of *B. marequensis* and *B. natalensis*, to develop a large *Varicorhinus*-like mouth is being used as one of the taxonomic characteristics in separating *B. polylepis* from *B. natalensis*.

If we compare specimens of *Barbus* and *Labeo* from the western tributaries of the Middle Zambezi River with specimens, of the same species, from the Lower Sabi River, it will be noticed that in fish of equal size, those from the extreme east have lower dorsal fins. The examination of material from intermediate points indicates that there is a distinct cline in the range of the height of the dorsal fin from west to east. In very large fish this is not evident for at a certain stage in growth the dorsal fin ceases to increase in height. *Labeo altivelis* from the Middle Zambezi, *Labeo altivelis* from the Lower Sabi, and the closely related *Labeo rosae* of the Limpopo River could therefore represent a cline, and it may become necessary to regard *L. rosae* as a geographical variation of *L. altivelis*.

The young of *Cyprinidae* and *Cichlidae* usually differ quite markedly from their adults in markings and colour pattern, but these differences are uniform. For example young *Tilapia mossambica* from the rivers of the South-east Cape are the same in appearance as those from the rivers of Southern Rhodesia. Morphologically *Tilapia placida* and *Tilapia mossambica* are identical, in particular their pharyngeal teeth, and can be separated only by the fact that the former has four anal spines and the latter three, a taxonomic characteristic of doubtful validity. It is, however, possible to separate the young of these species on body markings alone and for this reason they have been kept as separate species. Further research into the ecology and ethology of these two species, which are found together in the lowveld waters, is necessary before any final decision is made.

The number of barbels, one or two pairs, has been regarded as a taxonomic characteristic, but Barnard (1943) has demonstrated how misleading this can be. In addition to those examples quoted by him it has been found that in some species of *Barbus*, even in the adult, the anterior barbels are quite short or are entirely absent. *Barbus brookingi* and *Barbus trevelyani* are typical examples of this; the former, described as a new species by Gilchrist and Thompson,

has been found to be a form of *trevelyani* with short anterior barbels. The same applies to *Barbus mattozi* and *Barbus serrula*; the latter being an adult form of *mattozi* with just a single pair of barbels. In many large, and presumably old specimens of *Barbus* the barbels have been found to be very short, and in some cases they even have a withered appearance.

The skin pattern of species of *Clarias*, *Synodontis* and *Amphilius* has been found to vary considerably. *Clarias*, both young and adult, can be either plain or mottled, the mottled pattern remains after preservation. Live adult *Synodontis zambezensis* from the Middle Zambezi River are unspotted, but faint spots often develop some time after preservation. In *Synodontis nebulosus* the mottled pattern of large irregular blobs is most distinct in half-grown specimens but is sometimes barely discernible in large specimens. The young and adults of *Synodontis nigromaculatus* are spotted, mainly with uniform small dots on the caudal and dorsal fins. In the case of *Synodontis woosnami* both young and adults have a most variable but distinct pattern of dots and marbling which are responsible for the names *macrostigma* and *leopardinus*. This same variation occurs in *Amphilius platychir*, and, from a long series of specimens from one section of a small river in Southern Rhodesia, as many as fifteen distinct skin patterns can be recognised.

In many species mature males have characteristics by which they can be distinguished from females without dissection. Of the *Mormyridae*, *Characidae* and *Cyprinidae* examined personally the male has been found to be smaller than the female in what would appear to be the same age group. The anal fins of mature males and females of the former two families are different in shape. Typical examples will be found in the anal fins of *Petrocephalus catostoma*, *Alestes imberi*, *Alestes lateralis* and *Micralestes acutidens*, illustrations of which appear in Jubb 1961 (*b*). In the *Cyprinidae* any differences that may exist in the anal fin appear to be obscured by changes due to growth. In the case of *Barbus haasianus* and *Barbus afrovernayi* however, the anal fin of the male, particularly the former species, is long and sickle-shaped. The males of some small species of *Barbus*, examples being *Barbus afer*, *Barbus asper* and *Barbus motebensis*, develop conical tubercles on the snout and the top of the head, as well as minute tubercles on the scales and fins. These tubercles appear on males of *Barilius zambezensis* as well, but, in the case of large species of *Barbus* and all the *Labeo* found in the area under review, the presence of tubercles on the snout is not a sexual characteristic.

The live colours of some small species of *Barbus* can be used to separate mature males from females, and in material preserved in formalin these differences remain recognizable. For example the mature males of *Barbus pallidus* are golden without body markings, and the females silvery with lateral spots which become accentuated on preservation. These latter are identifiable with *Barbus hemipleurogramma*, a species now considered to be a synonym of *pallidus*. Sexual differences in live colours, particularly during the breeding season, also occur in *Barbus anoplus* and *Barbus motebensis*, and no doubt more examples will come to light as more live material is studied. In most of the *Cichlidae* the mature males differ in body markings from the females, these differences also remaining apparent in material preserved in formalin. Typical examples here are the females of *Haplochromis darlingi* and *Haplochromis philander*, which, like the immature males, have distinct vertical bars on their sides, whereas in large mature males these are absent.

The reasons for placing any particular species in synonomy with another are not discussed at length in this paper. If these are not found in the literature cited, then it is because sufficient evidence has been extracted from field and laboratory research. The catalogue and distribution tables which follow are submitted as a basis for future research into the validity of some of the more closely related species.

DISTRIBUTION TABLE A.

This table includes the fishes of the rivers of the Southern Cape south of the Great Escarpment, and those of the Eastern Plateau to as far as, but not including, the Umtamvuna River, designated C.P.; the fishes of the Orange River system, designated Or.; and the fishes of the rivers of Natal to as far north as, but not including, the Pongolo River, designated Na. The letter E indicates that that particular species is endemic to the river system quoted; where an E does not appear the river or area quoted indicates the approximate most southerly limit of distribution.

About 150 miles from the mouth of the Orange River are the Augrabies Falls, 480 feet in height, and situated in rugged country.

	C.P.	Or.	Na.	
Gnathonemus macrolepidotus ...			X	Umhlatuzi R.
Galaxias zebratus	X			E. S.W. Cape.
Galaxias punctifer	X			E. S.W. Cape.
Alestes lateralis			X	Zululand only.
Barbus capensis	X			E. Olifants R.
Barbus holubi		X		E. Orange R.
Barbus kimberleyensis		X		E. Orange R.
Barbus natalensis			X	
Barbus serra	X			E. Olifants R.
Barbus andrewi	X			E. Berg & Breede R.
Barbus trimaculatus		X	X	
Barbus paludinosus		X	X	
Barbus hospes		X		E. Orange R.
Barbus calidus	X			E. Olifants R.
Barbus trevelyani	X			E. Buffalo R.
Barbus phlegethon	X			E. Olifants R.
Barbus burchelli	X			E. Breede R.
Barbus burgi	X			E. Berg R.
Barbus asper	X			E. S. Cape.
Barbus tenuis...	X			E. Gouritz R.
Barbus afer	X			E. S.E. Cape.
Barbus pallidus	X	X	X	
Barbus anoplus	X	X	X	
Barbus gurneyi			X	
Barbus viviparus			X	
Barbus toppini			X	
Labeo seeberi	X			E. Olifants R.
Labeo umbratus	X	X		
Labeo quathlambae			X	E. Umkomaas R.
Labeo capensis		X		E. Orange R.
Labeo rubromaculatus			X	E. Tugela R.
Labeo cylindricus			X	
Engraulicypris brevianalis			X	
Engraulicypris gariepinus		X		E. Orange R.
Gephyroglanis sclateri		X		E. Orange R.
Gephyroglanis gilli	X			E. Olifants R.
Clarias gariepinus		X	X	
Clarias theodorae			X	

	C.P.	Or.	Na.	
Amphilius platychir			X	
Amphilius natalensis...			X	Mkuzi R.
Anguilla marmorata...	X		X	East Cape.
A. nebulosa labiata	X		X	East Cape.
Anguilla mossambica	X		X	
A. bicolor bicolor	X		X	East Cape.
Nothobranchius orthonotus			X	
Aplocheilichthys myaposae			X	
Aplocheilichthys katangae			X	
Tilapia mossambica	X		X	East Cape
Tilapia sparrmanii	X	X	X	
Tilapia melanopleura			X	
Haplochromis philander		X	X	
Sandelia capensis	X			E. S. Cape.
Sandelia bainsii	X			E. S.E. Cape.
Platygobius aeneofuscus			X	
Glossogobius giuris	X		X	East Cape.

Note:

Barbus holubi. Introduced from Vaal R. to Gouritz R. system in 1957.

Anguilla mossambica. Occasional *A. mossambica* cross the Limpopo—Vaal R. watershed and enter the Orange R. system.

DISTRIBUTION TABLE B.

This includes the Limpopo River system which has been divided into two sections, those tributaries which rise on the Transvaal Plateau, designated Li. Tv., and those which rise on the Matabele Highlands in Southern Rhodesia, designated Li. S. Rh.; the Incomati River system designated In.; and the Pongolo River system, designated Po.

The Limpopo River system has had to be divided into two sections because, in spite of the lack of physical barriers, the distribution of the fishes over this system is not homogeneous. There are several species quite common in the Transvaal tributaries which do not occur in those rising in Southern Rhodesia.

	Li. Tv.	Li. S. Rh.	In.	Po.
Petrocephalus catostoma	X	X	X	X
Gnathonemus macrolepidotus	X	X	X	X
Hydrocynus vittatus	X	X	X	X
Alestes imberi	X	X	X	X
Micralestes acutidens	X	X	X	X
Barbus polylepis	X		X	
Barbus natalensis				X
Barbus marequensis	X	X	X	X
Barbus mattozi	X	X		
Barbus trimaculatus	X	X	X	X
Barbus paludinosus	X	X	X	X
Barbus afrohamiltoni	X	X	X	X

	Li. Tv.	Li. S. Rh.	In.	Po.
Barbus eutaenia	X			
Barbus argenteus			X	X
Barbus pallidus	X			
Barbus motebensis	X			
Barbus anoplus	X			X
Barbus gurneyi				X
Barbus lineomaculatus	X	X	X	X
Barbus viviparus	X	X	X	X
Barbus annectens			X	
Barbus labialis	X	X	X	
Barbus treurensis	X		X	
Barbus toppini			X	X
Barbus rubellus			X	X
B. Beirabarbus radiatus	X	X	X	X
Varicorhinus nelspruitensis			X	X
Labeo rubropunctatus	X	X	X	X
Labeo cylindricus	X	X	X	X
Labeo rosae	X	X	X	X
Labeo ruddi	X		X	
Barilius zambezensis	X	X	X	X
Engraulicypris brevianalis	X	X	X	X
Clarias gariepinus	X	X	X	X
Clarias theodorae		X	X	X
Eutropius depressirostris	X	X	X	X
Synodontis zambezensis	X	X	X	X
Chiloglanis pretoriae	X	X		
Chiloglanis anoterus				X
Chiloglanis engiops			X	X
Chiloglanis paratus		X	X	X
Amphilius platychir	X	X	X	X
Anguilla marmorata	X	X	X	X
A. nebulosa labiata	X	X	X	X
Anguilla mossambica	X	X	X	X
A. bicolor bicolor	X	X	X	X
Nothobranchius orthonotus	X		X	X
Aplocheilichthys johnstonii	X		X	
Aplocheilichthys katangae	X	X	X	X
Aplocheilichthys myaposae				X
Tilapia mossambica	X	X	X	X
Tilapia sparrmanii	X	X	X	X
Tilapia melanopleura	X	X	X	X
Chetia flaviventris	X		X	
Haplochromis darlingi	X	X		
Haplochromis philander	X	X	X	X
Platygobius aeneofuscus	X	X	X	X
Glossogobius giuris	X	X	X	X

Note: *Barbus holubi*, endemic to the Orange River system, has been introduced into the Olifants River, Limpopo system, and is now established.

DISTRIBUTION TABLE C.

The major river system included in this table is the Zambezi, which, at a point approximately 900 miles from its mouth, is split by the Victoria Falls. Above these there is a vast low-graded river system which includes the Zambezi and its tributaries, the Mashi or Cuando River which rises in Angola and is connected with the Zambezi via the Chobe River, and the Okavango River which also rises in Angola where it is known as the Cubango River. The Okavango loses itself in the Okavango swamps, an area including the now dry Lake Ngami, but is connected to the Zambezi via the Chobe swamps during periods of heavy floods. This vast network of rivers and swamps has a fish fauna which is quite different from that of the Zambezi River below the Victoria Falls. This area is referred to as the Upper Zambezi River system, and is designated U.Z. Ok. The Middle Zambezi River system is that portion of the drainage system from below the Victoria Falls to the Kebrabassa Rapids, and from here to its mouth is referred to as the Lower Zambezi River system. These two areas have been lumped together and designated M.Z. L.Z.

Lake Kariba occupies most of that portion of the Middle Zambezi lying between the Batoka Gorge and the Kafue River. The massive concrete wall of this man-made lake, 450 feet in height, is an obstruction to the upstream migration of fishes which will, in time, affect the distribution of *Anguilla* in the system above it. The Kalomo River, and the Kafue River, both rising in Northern Rhodesia, are isolated from the Middle Zambezi system by waterfalls, and are not included in this table. Lake Nyasa, which has a rich endemic fish fauna, is also isolated from the Lower Zambezi system by a series of cataracts and rapids along the Shire River.

In the Inyanga Highlands the waters of the upper reaches of the Pungwe River are too cold for tropical fishes, but from 2,000 feet to sea level, in both the Pungwe and the Buzi rivers, the fish fauna is the same as that of the Middle and Lower Zambezi. These rivers are designated Pu. and Bu.

Near their confluence the Sabi and Lundi rivers are also split by waterfalls of sufficient height to prevent many Zambezi species found below them, from reaching the river systems above. These areas are referred to as the Lower Sabi or Lower Lundi, designated L.S. L.L., and the Upper Sabi or Upper Lundi, designated U.S. U.L. The presence of so many Zambezi species below these waterfalls is of considerable interest, indicating that at some stage after these falls had eroded there was a freshwater link between the Zambezi and the Sabi Rivers.

	U.Z. Ok.	M.Z. L.Z.	Pu. Bu.	U.S. U.L.	L.S. L.L.
Protopterus annectens		X	X		X
Kneria auriculata	X	X	X	X	
Kneria angolensis	U.Z.				
Mormyrops deliciosus		X	X		
Petrocephalus catostoma	X	X	X		X
Marcusenius discorhynchus	X	X	X		X
Marcusenius castelnaui	X				
Gnathonemus macrolepidotus	X	X	X	X	X
Mormyrus lacerda	X				
Mormyrus longirostris		X	X		X
Hydrocynus vittatus	X	X	X		X
Hepsetus odoë	X				
Alestes imberi		X	X		X
Alestes lateralis...	X	L.Z.			
Micralestes acutidens	X	X	X	X	X
Petersius barnardi			Pu.		
Distichodus mossambicus		X	X		X

	U.Z. Ok.	M.Z. L.Z.	Pu. Bu.	U.S. U.L.	L.S. L.L.
Distichodus schenga		X	X		X
Nannocharax multifasciatus	X				
Nannocharax monardi	X				
Barbus marequensis		X	X		X
Barbus codringtoni	X				
Barbus mattozi		M.Z.			
Barbus trimaculatus		X	X	X	X
Barbus poechii	X				
Barbus paludinosus	X	X	X	X	X
Barbus afrohamiltoni				X	X
Barbus eutaenia	X	X	X		
Barbus manicensis		X	X		
Barbus tangandensis	X		X	X	
Barbus multilineatus	X				
Barbus afrovernayi	X				
Barbus labialis	U.Z.				
Barbus lineomaculatus	X	X	X	X	
Barbus neefi	U.Z.				
Barbus viviparus	X	X	X	X	
Barbus barotseensis	X				
Barbus thamalakanensis	X				
Barbus haasianus	X				
Barbus puellus	X				
Barbus fasciolatus	X	M.Z.			
B. Beirabarbus radiatus		X	X	X	X
B. Beirabarbus aurantiacus	X				
Varicorhinus nasutus		X	X		
Varicorhinus pungweensis			Pu.		
Labeo rubropunctatus				X	X
Labeo congoro		X	X		X
Labeo cylindricus	X	X	X	X	X
Labeo lunatus	X				
Labeo altivelis		X	X		X
Barilius zambezensis	X	X	X		X
Engraulicypris brevianalis	U.Z.				
Auchenoglanis ngamensis	X				
Leptoglanis rotundiceps		X	X	X	X
Heterobranchus longifilis		X	X		
Clarias gariepinus	X	X	X	X	X
Clarias mossambicus	X	X			
Clarias ngamensis	X				
Clarias theodorae	X	X	X	X	X
Clarias dumerilii	X				
Schilbe mystus	X	M.Z.			
Eutropius depressirostris		X	X		X
Synodontis zambezensis		X	X		X
Synodontis nigromaculatus	X				
Synodontis nebulosus		X	X		
Synodontis woosnami	X				

	U.Z.	Ok.	M.Z.	L.Z.	Pu.	Bu.	U.S.	U.L.	L.S.	L.L.
Chiloglanis neumanni			X		X					
Chiloglanis fasciatus	X									
Amphilius platychir	X		X		X		X		X	
Malapterurus electricus			X		X					
Anguilla marmorata			X		X		X		X	
A. nebulosa labiata			X		X		X		X	
Anguilla mossambica			X		X		X		X	
A. bicolor bicolor			L.Z.		X.L.				X	
Nothobranchius orthonotus	X		X		X.L.				X	
Aplocheilichthys johnstonii	X		X		X				X	
Aplocheilichthys katangae	X		X		X				X	
Aplocheilichthys cabindae	U.Z.									
Tilapia placida			L.Z.		X.L.				X	
Tilapia macrochir	X									
Tilapia andersonii	X									
Tilapia mossambica			X		X		X		X	
Tilapia sparrmanii	X		X		X		X		X	
Tilapia melanopleura	X		X		X		X		X	
Hemichromis fasciatus	X									
Sargochromis codringtoni	X		M.Z.							
Serranochromis robustus	X									
Serranochromis macrocephala	X									
Serranochromis levaillantii	X									
Serranochromis thumbergi	X									
Haplochromis carlottae	X									
Haplochromis frederici	X									
Haplochromis jallae	X									
Haplochromis darlingi	X		X		X		X		X	
Haplochromis philander	X		X		X		X		X	
Haplochromis swynnertoni					X				X	
Ctenopoma multispinis	X		L.Z.							
Ctenopoma ctenotis	U.Z.									
Platygobius aeneofuscus			X		X		X		X	
Glossogobius giuris			L.Z.		X		X		X	
Mastacembalus mellandi	X									
Mastacembalus mutombotombo ...	X									

Note. The following movements of fishes have been made beyond barriers to natural migration:

Mormyrus longirostris. From the Lower Lundi River to Kyle Dam, near Fort Victoria, which is on the Upper Lundi system. Introduction made 1961.

Barbus natalensis. From Natal to the Upper Sabi River near Wedza. Introduction made 1960.

Tilapia placida. From the Lower Lundi River to Kyle Dam, near Fort Victoria, which is on the Upper Lundi system. Introduction made 1961.

Tilapia macrochir. From the Kafue River system into Lake Kariba, which is on the Middle Zambezi system. Introduction made 1958.

Tilapia andersonii. From the Kafue River system into farm dams on the Middle Zambezi system for stocking purposes.

Tilapia melanopleura. From the Lower Lundi River into the Mushandike Dam, near Fort Victoria, which is on the Upper Lundi system. This species is now established over the whole Lundi system. Introduction made 1937.

List of Synonyms:

Mormyrops zambanenje Peters, see *M. deliciosus* (Leach).
Petrocephalus stuhlmanni Boulenger, see *P. catostoma* Günther.
Marcusenius cubangoensis Pellegrin, see *M. discorhynchus* (Peters).
Gnathonemus pongolensis Fowler, see *G. macrolepidotus* (Peters).
Mormyrus ellenbergeri Pellegrin, see *M. lacerda* Castelnau.
Mormyrus anchietae Guimaraes, see *M. lacerda* Castelnau.
Mormyrus mucupe Peters, see *M. longirostris* Peters.
Galaxias dubius G. & T., see *G. zebratus* Castelnau.
Hydrocyon lineatus Bleeker, see *Hydrocynus vittatus* Castelnau.
Hydrocyonoides cuvieri Castelnau, see *Hepsetus odoë* (Bloch).
Alestes langi Fowler, see *A. lateralis* Boulenger.
Alestes thamalakanensis Fowler, see *A. lateralis* Boulenger.
Micralestes humilis Boulenger, see *Micralestes acutidens* (Peters).
Petersius maunensis Fowler, see *Alestes lateralis* Boulenger.
Petersius woosnami Boulenger, see *Micralestes acutidens* (Peters).
Distichodus (*Distichodina*) *stigmaturus* Fowler, see *Nannocharax multifasciatus* Boulenger.
Barbus aureus (Cope), see *B. natalensis* Castelnau.
Barbus bariloides Boulenger, see *B. fasciolatus* Günther.
Barbus bifrenatus Fowler, see *B. viviparus* M. Weber.
Barbus bowkeri Boulenger, see *B. natalensis* Castelnau.
Barbus brucii Boulenger, see *B. marequensis* A. Smith.
Barbus brookingi G. & T., see *B. trevelyani* Günther.
Barbus (*Puntius*) *carpenteri* Fowler, see *B. multilineatus* Worthington.
Barbus chilotes Boulenger, see *B. codringtoni* Boulenger.
Barbus cookei G. & T., see *B. marequensis* A. Smith.
Barbus crocodilensis Fowler, see *B. argenteus* Günther.
Barbus dendrotrachelus Fowler, see *B. natalensis* Castelnau.
Barbus dwaarsensis G. & T., see *B. marequensis* A. Smith.
Barbus fairbairnii Boulenger, see *B. marequensis* A. Smith.
Barbus fitzsimonsi Fowler, see *B. thamalakanensis* Fowler.
Barbus gilchristi Boulenger, see *B. holubi* Steindachner.
Barbus grouti Fowler, see *B. natalensis* Castelnau.
Barbus gunningi G. & T., see *B. marequensis* A. Smith.
Barbus hamiltoni G. & T., see *B. afrohamiltoni* Crass.
Barbus hemipleurogramma Boulenger, see *B. pallidus* A. Smith.
Barbus hypostomatus Pellegrin, see *B. codringtoni* Boulenger.
Barbus inermis Peters, see *B. marequensis* A. Smith.
Barbus ivongoensis Fowler, see *B. paludinosus* Peters.
Barbus karkensis G. & T., see *B. anoplus* M. Weber.
Barbus kerstenii non Peters, see *B. eutaenia* Boulenger.
Barbus lineolatus G. & T., see *B. polylepis* Boulenger.
Barbus lobochilus Boulenger, see *B. natalensis* Castelnau.
Barbus longicauda Peters, see *B. paludinosus* Peters.
Barbus macrurus G. & T., see *B. labialis* G. & T.
Barbus marleyi Fowler, see *B. natalensis* Castelnau.
Barbus mentalis G. & T., see *B. holubi* Steindachner.
Barbus m'fongosi G. & T., see *B. natalensis* Castelnau.
Barbus miolepis non Boulenger, see *B. tangandensis* Jubb.
Barbus (*Beirabarbus*) *okavangoensis* Barnard, see *B.* (*Beirabarbus*) *aurantiacus* (*Boulenger*).

Barbus (*Beirabarbus*) *palustris* Herre, see *B.* (*Beirabarbus*) *radiatus* (Peters).
Barbus pienaarii Fitzsimons, see *B. kimberleyensis* G. & T.
Barbus rapax Steindachner, see *B. mattozi* Guimaraes.
Barbus rhodesianus Boulenger, see *B. marequensis* A. Smith.
Barbus robinsoni G. & T., see *B. natalensis* Castelnau.
Barbus rogersi Boulenger, see *B.* (*Beirabarbus*) *aurantiacus*.
Barbus sabiensis G. & T., see *B. marequensis* A. Smith.
Barbus sauvagei Pellegrin, see *B. mattozi* Guimaraes.
Barbus sector Boulenger, see *B. marequensis* A. Smith.
Barbus seeberi G. & T., see *B. capensis* A. Smith.
Barbus senticeps J. L. B. Smith, see *B. afer* Peters.
Barbus serrula G. & T., see *B. mattozi* Guimaraes.
Barbus stigmaticus Fowler, see *B. natalensis* Castelnau.
Barbus swierstrae G. & T., see *B. marequensis* A. Smith.
Barbus tsotsorogensis Fowler, see *B. paludinosus* Peters.
Barbus tugelensis Fowler, see *B. natalensis* Castelnau.
Barbus umbeluziensis Groenewald, see *Barbus toppini* Boulenger.
Barbus victoriae Boulenger, see *B. marequensis* A. Smith.
Barbus vulneratus Castelnau, see *B. burchelli* A. Smith.
Barbus zuluensis G. & T., see *B. natalensis* Castelnau.
Barbus zambezensis (Peters)., see *B. marequensis* A. Smith.
Varicorhinus brucii Boulenger, see *B. marequensis* A. Smith.
Labeo cafer Castelnau, see *L. umbratus* A. Smith.
Labeo darlingi Boulenger, see *L. cylindricus* Peters.
Labeo hamiltoni G. & T., see *L. rosae* Steindachner.
Labeo parvulus G. & T., see *L. cylindricus* Peters.
Labeo sicheli Castelnau, see *L. umbratus* A. Smith.
Labeo stenningi G. & T., see *L. umbratus* A. Smith.
Labeo tenuirostris Steindachner, see *L. capensis* A. Smith.
Barilius neavii Boulenger, see *B. zambezensis* (Peters).
Barilius peringueyi G. & T., see *B. zambezensis* (Peters).
Barilius stephensoni G. & T., see *B. zambezensis* (Peters).
Engraulicypris whitei v. d. Horst, see *E. brevianalis* (Boulenger).
Clarias capensis C. & V., see *C. gariepinus* (Burchell).
Dinotopterus jallae G. & T., see *Clarias ngamensis* Castelnau.
Synodontis jallae G. & T., see *S. woosnami* Boulenger.
Synodontis macrostigma Boulenger, see *S. woosnami* Boulenger.
Synodontis leopardinus Pellegrin, see *S. woosnami* Boulenger.
Synodontis melanostictus Boulenger, see *S. nigromaculatus* Boulenger.
Synodontis thamalakanensis Fowler, see *S. woosnami* Boulenger.
Amphilius brevidorsalis Pellegrin, see *A. platychir* Günther.
Amphilius grandis Boulenger, see *A. platychir* Günther.
Amphilius hargeri Boulenger, see *A. platychir* Günther.
Amphilius platychir var. *cubangoensis* Pellegrin, see *A. platychir* Günther.
Amphilius transvaalensis v. d. Horst, (figure), see *A. platychir* Günther.
Anguilla australis non Richardson, see *Anguilla bicolor bicolor* McClelland.
Anguilla bengalensis non Gray, see *Anguilla nebulosa labiata* Peters.
Anguilla capensis Kaup, see *A. mossambica* Peters.
Anguilla macrophthalma Peters, see *Anguilla nebulosa labiata* Peters.
Anguilla virescens Peters, see *Anguilla bicolor bicolor* McClelland.

Fundulus mkuziensis Fowler, see *Nothobranchius orthonotus* (Peters).
Haplochilus carlislei v. d. Horst, see *Aplocheilichthys katangae* (Boulenger).
Aplocheilichthys chobensis Fowler, see *A. johnstonii* (Günther).
Tilapia alleni Fowler, see *Tilapia macrochir* Boulenger.
Tilapia arnoldi G. & T., see *T. mossambica* Peters.
Tilapia deschauenseei Fowler, see *T. sparrmanii* A. Smith.
Tilapia druryi G. & T., see *T. melanopleura* Dumeril.
Tilapia guinasana Trewavas, see *T. sparrmanii* A. Smith.
Tilapia intermedia G. & T., see *T. andersonii* (Castelnau).
Tilapia kafuensis Boulenger, see *T. andersonii* (Castelnau).
Tilapia kirkhami G. & T., see *T. melanopleura* Dumeril.
Tilapia mackeani G. & T., see *T. melanopleura* Dumeril.
Tilapia natalensis Weber, see *T. mossambica* Peters.
Tilapia rumsayi G. & T., see *Haplochromis darlingi* (Boulenger).
Tilapia sheshekensis G. & T., see *T. macrochir* Boulenger.
Tilapia swierstrae G. & T., see *T. melanopleura* Dumeril.
Tilapia sykesii G. & T., see *T. melanopleura* Dumeril.
Tilapia vorax Pfeffer, see *T. mossambica* Peters.
Astatotilapia ellenbergeri Pellegrin, see *Haplochromis darlingi* (Boulenger).
Pelmatochromis genisquamulatus Pellegrin, see *Serranochromis robustus* (Günther).
Pelmatochromis ngamensis G. & T., see *Serranochromis robustus* (Günther).
Pelmatochromis robustus G. & T., see *Haplochromis frederici* (Castelnau).
Paratilapia angusticeps Boulenger, see *Serranochromis levaillantii* (Castelnau).
Paratilapia arnoldi G. & .T, see *Haplochromis darlingi* (Boulenger).
Paratilapia ellenbergeri G. & T., see *Serranochromis macrocephala* (Boulenger).
Paratilapia gibbiceps Boulenger, see *Haplochromis carlottae* (Boulenger).
Paratilapia kafuensis Boulenger, see *Serranochromis levaillantii* (Castelnau).
Paratilapia longimanus Boulenger, see *Serranochromis macrocephala* (Boulenger).
Paratilapia marginata G. & T., see *Sargochromis codringtoni* (Boulenger).
Paratilapia smithii (Castelnau), see *Hemichromis fasciatus* Peters.
Paratilapia zambezensis G. & T., see *Serranochromis robustus* (Günther).
Serranochromis thumbergi (non Castelnau), see *Chetia flaviventris* Trewavas.
Haplochromis moffati (non Castelnau), see *H. philander* (M. Weber).
Anabas rhodesianus G. & T., see *Ctenopoma multispinis* Peters.
Anabas vernayi Fowler, see *Ctenopoma multispinis* Peters.
Anabas vicinus Boulenger, see *Sandelia capensis* (C. & V.).
Mastacembelus thompsoni Boulenger, see *M. mellandi* Boulenger.

Family: LEPIDOSIRENIDAE
Genus: *Protopterus* Owen, 1839.
Species: **Protopterus annectens brieni** Poll, 1961.
Distribution: Middle and Lower Zambezi River system, Lower Pungwe, Buzi and Sabi River systems.
Jackson, 1958. Jubb, 1961 (*b*). Poll, 1961.

Family: KNERIIDAE
Genus: *Kneria* Steindachner, 1866.
Synonym: *Xenopomatichthys* Pellegrin, 1905.

Species: **Kneria auriculata** (Pellegrin), 1905.
Distribution: Zambezi River system, southwards to the Sabi and Lundi River systems.
Trewavas, 1936. Jubb, 1961 (*b*).
Kneria angolensis Steindachner, 1866.
Distribution: Upper Zambezi River.
Jackson, 1961 (*c*).

Family: MORMYRIDAE
Genus: *Mormyrops* J. Muller, 1843.
Species: **Mormyrops deliciosus** (Leach), 1818.
Distribution: Middle and Lower Zambezi River system, Pungwe and Buzi Rivers, warm waters.
Synonym: *Mormyrus zambanenje* Peters, 1852.
Gilchrist & Thompson, 1913. Jubb, 1961 (*b*).

Genus: *Petrocephalus* Marcusen, 1854.
Species: **Petrocephalus catostoma** (Günther), 1866.
Distribution: Zambezi River system, warm waters, southwards along east coast to as far as the Pongolo River system.
Synonym: *P. stuhlmanni* Boulenger, 1909.
Whitehead & Greenwood, 1959. Crass, 1960.
Jubb, 1961 (*b*), (*P. catastoma*).

Genus: *Marcusenius* Gill, 1862.
Species: **Marcusenius discorhynchus** (Peters), 1852.
Distribution: Zambezi River system, warm waters, and south along east coast to the Sabi River.
Synonym: *M. cubangoensis* Pellegrin, 1936.
NOTE: Zambezi material shows gibbosity on chin and anal ray count to be variable.
Gilchrist & Thompson, 1913. Barnard, 1948.
Jubb, 1961 (*b*), (*M. discorhyncus*).
Marcusenius castelnaui Boulenger, 1911.
Distribution: Upper Zambezi River system.
Jubb, 1961 (*b*).

Genus: *Gnathonemus* Gill, 1862.
Species: **Gnathonemus macrolepidotus** (Peters), 1852.
Distribution: Zambezi River system, all levels, southwards to the Pongolo River system, and the Umhlatuzi River.
Synonym: *G. pongolensis* Fowler, 1934.
Fowler, 1934 (*b*). Crass, 1960. Jubb, 1961 (*b*).

Genus: *Mormyrus* Linnaeus, 1766.
Species: **Mormyrus lacerda** Castelnau, 1861.
Distribution: Upper Zambezi River system.
Synonym: *M. ellenbergeri* Pellegrin, 1914.
NOTE: This species has been recorded as *M. anchietae* Guimaraes, 1884, which is probably also a synonym.
Fowler, 1935 (*b*). Jubb, 1961 (*b*).

Mormyrus longirostris Peters, 1852.
Distribution: Middle and Lower Zambezi River system, the Pungwe, Buzi and Lower Sabi Rivers.
Synonym: *M. mucupe* Peters, 1852.
Jubb, 1961 (*b*).

Family: GALAXIIDAE
Genus: *Galaxias* Cuvier, 1817.
Species **Galaxias zebratus** (Castelnau), 1861.
Distribution: The Olifants River system, S.W. Cape, the rivers of the south coast, eastwards to as far as the Malagas River, George.
Synonym: *G. dubius* Gilchrist & Thompson, 1917.
Barnard, 1943.
Galaxias punctifer (Castelnau), 1861.
Distribution: Rivers of the extreme S.W. Cape.
Barnard, 1943.
NOTE: The above *Galaxias* do not migrate to the sea for breeding purposes.

Family CHARACIDAE
Genus: *Hydrocynus* Cuvier, 1817.
Species: **Hydrocynus vittatus** Castelnau, 1861.
Distribution: Zambezi River system, southwards to the Lower Sabi River, and the warm waters of the Limpopo, Incomati and Pongolo River systems.
Synonym: *Hydrocyon lineatus* Bleeker, 1862.
Barnard, 1948, (Synonomy). Jubb, 1952, 1961 (*b*).
Crass, 1960. Jackson, 1961 (*a*) (Biology). (*Hydrocyon vittatus*) 1961 (*c*).
Myers, 1950, (Nomenclature).

Genus: *Hepsetus* Swainson, 1838.
Species: **Hepsetus odoë** (Bloch), 1794.
Distribution: Upper Zambezi River system.
Synonym: *Hydrocyonoides cuvieri* Castelnau, 1861.
Barnard, 1948, (Nomenclature).
Jackson, 1961 (*c*).
Jubb, 1952, (Distribution). Jubb, 1961 (*b*).

Genus: *Alestes* Muller & Troschel, 1846.
Species: **Alestes imberi** Peters, 1852.
Distribution: Middle and Lower Zambezi River system, southwards to the Lower Sabi, Limpopo, Incomati and Pongolo River systems.
Crass, 1960. Jubb, 1961 (*b*).
Alestes lateralis Boulenger, 1900.
Distribution: The Upper Zambezi River system, where common; absent from Middle Zambezi; reported from Lower Zambezi River, Crass, 1960; absent from Limpopo, Incomati and Pongolo River systems, and occurs again in restricted areas, Zululand, Natal.
Synonyms: *A. thamalakanensis* Fowler, 1935.
A. langi Fowler, 1935.
Petersius maunensis Fowler, 1935.
Fowler, 1935 (*b*).
Crass, 1960. Jubb, 1961 (*b*).

Genus: *Micralestes* Boulenger, 1899.
Species: **Micralestes acutidens** (Peters), 1852.
Distribution: The Zambezi River system, southwards to the Pongolo River system.
Synonyms: *Petersius woosnami* Boulenger, 1907, as reported by Pellegrin, 1936, from the Cubango River.
Micralestes humilis Boulenger, 1899, as reported by Jubb, 1958.
Barnard, 1948. Jubb, 1961 (*b*).
Genus: *Petersius* Hilgendorf, 1894.
Species: **Petersius barnardi** Herre, 1936.
Distribution: The Lower Pungwe River, Portuguese East Africa.
Barnard, 1948.

Family: CITHARINIDAE
Genus: *Distichodus* Muller & Troschel, 1845.
Species: **Distichodus mossambicus** Peters, 1852.
Distribution: Middle and Lower Zambezi River system, warm waters, south to the Lower Sabi River.
Jubb, 1954, and 1961 (*b*).
Distichodus schenga Peters, 1852.
Distribution: Middle and Lower Zambezi River system, warm waters, south to the Lower Sabi River.
Jubb, 1954 and 1961 (*b*).

Genus: *Nannocharax* Günther, 1867.
Species: **Nannocharax multifasciatus** Boulenger, 1923.
Distribution: Upper Zambezi River system.
Synonym: *Distichodus* (*Distichodina*) *stigmaturus* Fowler, 1935.
Fowler, 1935 (*b*).
Barnard, 1948.
Jubb, 1961 (*b*).
Nannocharax monardi (Pellegrin), 1935.
Distribution: Upper Cubango River (Okavango).
Described as *Hemigrammocharax monardi*, resembles *N. multifasciatus*, but has broken lateral line.
Barnard, 1948.

Family: CYPRINIDAE.
Genus: *Barbus* Cuvier, 1817.
Species: Without serrated dorsal spine.
Barbus capensis A. Smith, 1841.
Distribution: Endemic, Olifants River, S.W. Cape.
Synonym: *Barbus seeberi* Gilchrist & Thompson, 1913.
Barnard, 1943.
NOTE: Gilchrist & Thompson's figure of *B. capensis*, taken from Boulenger, is of *B. andrewi* Barnard, 1937.
Barbus holubi Steindachner, 1894.
Distribution: Originally endemic in the Orange River system, but has been introduced into the Gouritz River, S. Cape, and the Olifants River, Limpopo River system, where now established.

Synonyms: *B. gilchristi* Boulenger, 1911.
B. mentalis Gilchrist & Thompson, 1913.
Harrison, 1959. Groenewald, 1958.

Barbus kimberleyensis Gilchrist & Thompson, 1913.

Distribution: Endemic, Orange River system.

Synonym: *B. pienaarii* Fitzsimons, 1949.
Groenewald, 1958.

Barbus polylepis Boulenger, 1907.

Distribution: The Transvaal tributaries of the Limpopo River system, Incomati River.

Synonym: *B. lineolatus* Gilchrist & Thompson, 1913.
Groenewald, 1958. (*B. marequensis* non A. Smith.)
Crass, 1960. (*B. aureus*.)

NOTE: Greenwood has compared fresh material from the Marico River, Limpopo system, with the type specimen.

Barbus natalensis Castelnau, 1861.

Distribution: The Pongolo River system southwards to the Umtamvuna River system.

Synonyms: *B. aureus* (Cope), 1869.
B. bowkeri Boulenger, 1902.
B. dendrotrachelus Fowler, 1934.
B. grouti Fowler, 1934.
B. lobochilus Boulenger, 1911.
B. marleyi Fowler, 1934.
B. m'fongosi Gilchrist & Thompson, 1913.
B. robinsoni Gilchrist & Thompson, 1913.
B. stigmaticus Fowler, 1934.
B. tugelensis Fowler, 1934.
B. zuluensis Gilchrist & Thompson, 1913.
Fowler, 1934 (*a*) and (*b*). Crass, 1960.

Barbus marequensis A. Smith, 1841.

Distribution: The Middle and Lower Zambezi River system, the Pungwe, Buzi and Lower Sabi Rivers, the Limpopo River system southwards to the Pongolo River.

Synonyms: *B. brucii* Boulenger, 1907.
B. cookei Gilchrist & Thompson, 1913.
B. dwaarsensis Gilchrist & Thompson, 1913.
B. fairbairnii Boulenger, 1908.
B. gunningi Gilchrist & Thompson, 1913.
B. inermis Peters, 1852. (Immature specimen.)
B. rhodesianus Boulenger, 1902.
B. sabiensis Gilchrist & Thompson, 1913.
B. sector Boulenger, 1907.
B. swierstrae Gilchrist & Thompson, 1913.
B. victoriae Boulenger, 1908.
B. zambezensis (Peters), 1852.
Varicorhinus brucii Boulenger, 1907.
du Plessis, 1956. (Page 85.)
Groenewald, 1958. (Synonomy.)
Greenwood & Crass, 1959. (Status of type specimen.)
Crass, 1960. Jubb, 1961 (*b*).

NOTE: In *Barbus natalensis* and *Barbus marequensis* the mouth has been found to vary from the *Varicorhinus*-like square mouth with lower cutting jaw, to rubber-lip varieties, as well as intermediate stages.

The position with regard to *B. elephantis* Boulenger, 1907, still remains obscure. This species has not been found in its type locality by Groenewald (1958), or by recent collecting.

Barbus codringtonii Boulenger, 1908.
Distribution: Upper Zambezi River system.
Synonyms: *B. chilotes* Boulenger, 1908.
B. hypostomatus Pellegrin, 1936.
Jubb, 1961 (*b*).
Species: Those with serrated dorsal spine.

Barbus serra Peters, 1864.
Distribution: Endemic, Olifants River, S.W. Cape.
Barnard, 1943.

Barbus andrewi Barnard, 1937.
Distribution: Endemic, Berg and Breede Rivers, S.W. Cape.
NOTE: Dorsal spine serrations not visible in large specimens.
Barnard, 1943.

Barbus mattozi Guimaraes, 1884.
Distribution: The Limpopo River system but has crossed the Limpopo-Zambezi watershed in the Bulawayo area where it is found in the Umgusa River, tributary of the Gwaai River of the Middle Zambezi system.
Synonyms: *B. rapax* Steindachner, 1894. *B. sauvagei* Pellegrin, 1912.
B. serrula Gilchrist & Thompson, 1913.
Groenewald, 1958. Jubb, 1961 (*b*).
NOTE: Anterior barbels often absent.

Small species of *Barbus* with radiately striated scales.
A. Those with dorsal spine not serrated.
Species: **Barbus trimaculatus** Peters, 1852.
Distribution: Middle and Lower Zambezi River systems, southwards to the Pongolo River system.
Groenewald, 1958. Crass, 1960. Jubb, 1961 (*b*).

Barbus poechii Steindachner, 1911.
Distribution: Upper Zambezi River system.
Synonym: *B. bernardcarpi* Jubb, 1958.
Jubb, 1961 (*b*). Greenwood, 1962 (*c*).
B. Those with dorsal spine serrated.

Barbus paludinosus Peters, 1852.
Distribution: Widely distributed, Zambezi system to the Orange River system, and the Uvongo River, Natal.
Synonyms: *B. ivongoensis* Fowler, 1934.
B. longicauda Peters, 1852.
B. tsotsorogensis Fowler, 1935.
Barnard, 1943 and 1948. Groenewald, 1958.
Crass, 1960. Jubb, 1961 (*b*). Greenwood, 1962 (*a*).
There is one closely related species within the area:

Barbus hospes Barnard, 1938.
Distribution: Endemic, Orange River, Namaqualand.
Barnard, 1938 (*b*), 1943.

Barbus afrohamiltoni Crass, 1960.
Previously known as *B. hamiltoni* Gilchrist & Thompson, 1913.
Distribution: Sabi and Lundi River systems, southwards to the Pongolo River system.
Groenewald, 1958, (*B. hamiltoni*). Jubb, 1961 (*b*).

Barbus eutaenia Boulenger, 1904.
Distribution: Zambezi River system southwards to the Limpopo River system.
Groenewald, 1958, (*B. kerstenii*). Jubb, 1961 (*b*).
NOTE: Number of branched rays in dorsal spine 7 or 8 in populations of *B. eutaenia*.

Barbus manicensis Pellegrin, 1919.
Distribution: Middle and Lower Zambezi River system, the Pungwe River, mainly mountainous streams.
Jubb, 1961 (*b*). Greenwood, 1962 (*in litt.*).

Barbus argenteus Günther, 1868.
Distribution: Incomati and Pongolo River systems.
Synonym: *Barbus crocodilensis* Fowler, 1934.
Groenewald, 1958. Crass, 1960. Greenwood, 1962 (*in litt.*).
NOTE: Greenwood has compared fresh material with type specimen.

Barbus tangandensis Jubb, 1954
Distribution: Zambezi River system, southwards to the Pungwe, Buzi and Sabi River systems.
Jubb, 1961 (*b*), (*B. miolepis* non Boulenger, 1902.) Greenwood, 1962 (*a*).

Barbus multilineatus Worthington, 1933.
Distribution: Upper Zambezi River system.
Synonym: *Puntius carpenteri* Fowler, 1949.
Jubb, 1961 (*b*).

Barbus afrovernayi Nichols & Boulton, 1927.
Distribution: Upper Zambezi River system.
Jubb, 1961 (*b*).

Barbus calidus Barnard, 1938.
Distribution: Endemic, Olifants River system, S.W. Cape.
Barnard, 1938 (*b*), 1943.

Barbus trevelyani Günther, 1877.
Distribution: Endemic, Buffalo River, S.E. Cape.
Synonym: *B. brookingi* Gilchrist & Thompson, 1913.
Crass, 1960.
NOTE: Material has been collected in the Buffalo River which shows that short anterior barbels are sometimes present in *B. trevelyani*.

C. Those with dorsal spine flexible, not serrated.

Barbus phlegethon Barnard, 1938.
Distribution: Endemic, Olifants River, S.W. Cape.
Barnard, 1938 (*b*), 1943.

Barbus burchelli A. Smith, 1841.
Distribution: Endemic, Breede River system.
Synonym: *B. vulneratus* (Castelnau), 1861.
Barnard, 1943. Greenwood, 1962 (*in litt.*)

Barbus burgi Boulenger, 1911.

Distribution: Berg River and streams around Cape Town. Endemic to the area.
Barnard, 1943. Greenwood, 1962 (*in litt.*)

Barbus asper Boulenger, 1911.

Distribution: Gouritz River system eastwards to the upper Gamtoos River system, but not the Kromme River. Endemic to the area.
Barnard, 1943, Jubb, 1959 (*b*).

NOTE: Specimens have been collected in the Knysna area with caudal peduncle scale counts as low as 12, average 16.

Barbus tenuis Barnard, 1938.

Distribution: Endemic to the Gouritz River system where it is found together with *B. asper*.
Barnard, 1938 (*b*), 1943.

NOTE: *B. tenuis* differs from *B. asper* in slender shape, and males do not have warts on head.

Barbus afer Peters, 1864.

Distribution: Endemic to the Kromme, Swartkops and the Witte River systems. The Witte River is a tributary of the Sundays River. Also recorded from the Baakens River, but appears to be absent from the Kabeljouws River and the van Staadens River.
Barnard, 1943.

Synonym: *B. senticeps* J. L. B. Smith, 1936.

NOTE: The types of *B. afer* from the Berlin Museum have been examined. The type of *B. senticeps* has 12 scales around the caudal peduncle.

Barbus anoplus M. Weber, 1897.

Distribution: From the Olifants River in the S.W. Cape, and the Gouritz River system, S. Cape, to the Transvaal tributaries of the Limpopo River system, the Incomati and Pongolo River systems.

Synonym: *B. karkensis* Gilchrist & Thompson, 1913.
Barnard, 1943. Groenewald, 1958. Crass, 1960.

NOTE: Barnard, 1943, describes two additional varieties of *B. anoplus*. Groenewald, 1958, shows that lateral line tubules can be complete or incomplete.

Barbus pallidus A. Smith, 1841.

Distribution: Gamtoos River system, eastwards and northwards, including the Orange River system, to the Transvaal tributaries of the Limpopo River.

Synonym: *B. hemipleurogramma* Boulenger, 1911. (Female).
Barnard, 1943. Groenewald, 1958. (*B. hemipleurogramma*).

Barbus motebensis Steindachner, 1894.

Distribution: Transvaal tributaries of the Limpopo River.
Gilchrist & Thompson, 1913.

Barbus gurneyi Günther, 1868.

Distribution: From the Umtamvuna River, Natal, northwards to beyond the Tugela River system, but not including the Pongolo River system.
Crass, 1960.

Barbus lineomaculatus Boulenger, 1903.

Distribution: Middle Zambezi River system, southwards to the Pongolo River system.
Groenewald, 1958. Jubb, 1961 (*b*). Greenwood, 1962 (*in litt.*)

NOTE: Greenwood has examined fresh material of *B. lineomaculatus* and finds that the form without spots has been confused with *B. unitaeniatus*. He is of the opinion that *B. lineomaculatus* may prove to be a synonym of *B. innocens* Pfeffer, 1896.

Barbus neefi Greenwood, 1962.

Distribution: Headwaters, Upper Zambezi River.

Greenwood, 1962 (*b*).

Barbus viviparus M. Weber, 1897.

Distribution: Zambezi River system, southwards to the Umtamvuna River, Natal.

Synonym: *B. bifrenatus* Fowler, 1935.

Barnard, 1948. Groenewald, 1958. Crass, 1960. Jubb, 1961 (*b*).

NOTE: The status of *B. bifrenatus* is being re-examined.

Barbus annectens Gilchrist & Thompson, 1917.

Distribution: Incomati River system.

Gilchrist & Thompson, 1917.

NOTE: Material from the type locality shows dorsal branched ray count to be predominantly 8.

Barbus labialis Gilchrist & Thompson, 1913.

Distribution: Limpopo, Incomati and Upper Zambezi River systems.

Synonym: *B. macrurus* Gilchrist & Thompson, 1913.

Groenewald, 1958. Jubb, 1961 (*b*).

Barbus barotseensis Pellegrin, 1920.

Distribution: Upper Zambezi River system.

Barnard, 1948.

NOTE: Young *B. trimaculatus* have flexible dorsal spine but can be distinguished from *B. barotseensis* by the long barbels.

Barbus thamalakanensis Fowler, 1935.

Distribution: Upper Zambezi River system.

Synonym: *B. fitzsimonsi* Fowler, 1935.

Barnard, 1948.

Barbus treurensis Groenewald, 1958.

Distribution: The Transvaal tributaries of the Limpopo River system.

Groenewald, 1958.

Barbus haasianus David, 1936.

Distribution: The Upper Zambezi River system.

David, 1936.

NOTE: The males of *B. haasianus* have long sickle-shaped anal fins and resemble greatly *Barbus wöhlerti* described by Trewavas, 1938, as coming "probably from Portuguese East Africa".

Barbus puellus Nichols & Boulton, 1927.

Distribution: The Upper Zambezi River system.

Jubb, 1958.

Barbus fasciolatus Günther, 1868.

Distribution: The Zambezi River system, not found in cold water.

Synonym: *B. bariloides* Boulenger, 1914.

Jubb, 1961 (*b*). Jackson, 1961 (*c*).

Barbus toppini Boulenger, 1916.

Distribution: Incomati, Umbeluzi, Pongolo and Mkuzi River systems.

Synonym: *B. umbeluziensis* Groenewald, 1958.

Crass, 1960.

Barbus rubellus (Crass), 1960.
Distribution: Pongolo and Incomati River systems.
Crass, 1960.

Barbus (Beirabarbus) radiatus (Peters) 1853.
Distribution: Middle Zambezi system southwards to the Umbuluzi River.
Synonym: *B.* (*Beirabarbus*) *palustris* Herre, 1936.
Groenewald, 1958. Jubb, 1961 (*b*). Greenwood, 1962 (*a*).
NOTE: The type of *B. radiatus* Peters, has been examined.

Barbus (Beirabarbus) *aurantiacus* Boulenger, 1910.
Distribution: Upper Zambezi River system.
Synonyms: *B. rogersi* Boulenger, 1911.
B. Beirabarbus okavangoensis Barnard, 1941.
Barnard, 1948.
Jubb, 1961 (*b*). Greenwood, 1962 (*in litt.*)

Genus: *Varicorhinus* Rüppell, 1837.
Species: **Varicorhinus nasutus** Gilchrist & Thompson, 1911.
Distribution: Middle and Lower Zambezi River and Pungwe River.
Jubb 1959, 1961 (*b*).

Varicorhinus pungweensis Jubb, 1959.
Distribution: Pungwe River.
Jubb, 1961 (*b*).

Varicorhinus nelspruitensis Gilchrist & Thompson, 1911.
Distribution: Incomati and Pongolo River systems.
Groenewald, 1958. Crass, 1960.

Genus: *Labeo* Cuvier, 1817.
Species: **Labeo seeberi** Gilchrist & Thompson, 1911.
Distribution: Endemic, Olifants River, S.W. Cape.
Barnard, 1943.

Labeo umbratus A. Smith, 1841.
Distribution: Gouritz River eastwards to the Buffalo River, S.E. Cape, and the Orange River system.
Synonyms: *Labeo cafer* Castelnau, 1861.
L. sicheli Castelnau, 1861.
L. stenningi Gilchrist & Thompson, 1913.
Barnard, 1943.

Labeo quathlambae Barnard, 1938.
Distribution: Endemic, Umkomaas River system.
Allied to *L. umbratus*.
Barnard, 1938 (*a*), 1943. Crass, 1960.

Labeo capensis A. Smith, 1841.
Distribution: The Orange River system.
Barnard, 1943.

Labeo rubromaculatus Gilchrist & Thompson, 1913.
Distribution: Endemic, Tugela River system.
Barnard, 1943. Crass, 1960.

Labeo rubropunctatus Gilchrist & Thompson, 1913.
Distribution: Sabi and Lundi River systems, the Limpopo, Incomati and Pongolo River systems.
Crass, 1960. Jubb, 1961 (*b*).

Labeo congoro Peters, 1852.
Distribution: Middle and Lower Zambezi system, warm waters of Pungwe, Buzi and Lower Sabi River systems.
Jubb, 1961 (*b*).

Labeo cylindricus Peters, 1852.
Distribution: Zambezi River system, at all levels, southwards to the Tugela River in Natal. A variable species over its distribution range.
Synonyms: *L. darlingi* Boulenger, 1902.
L. parvulus Gilchrist & Thompson, 1913.
Crass, 1960. Jubb, 1961 (*b*).
NOTE: There is as yet an undescribed species of *Labeo* belonging to this group which is found in the Sabi, Lundi, Limpopo, Incomati and Pongolo River systems.

Labeo lunatus Jubb, 1963.
Distribution: The Upper Zambezi River system.
Jubb, 1961 (*b*), 1963.

Labeo altivelis Peters, 1852.
Distribution: Middle and Lower Zambezi River system, southwards to Lower Sabi River.
Jubb, 1961 (*b*).

Labeo rosae Steindachner, 1894.
Distribution: Limpopo River system, southwards to the Pongolo River system.
Synonym: *L. hamiltoni* Gilchrist & Thompson, 1917.
Jubb, 1961 (*b*).

Labeo ruddi Boulenger, 1907.
Distribution: The Transvaal tributaries of the Limpopo and Incomati Rivers.
Jubb, 1961 (*b*)
NOTE: *Labeo tenuirostris* is undoubtedly a specimen of *L. capensis* and its type locality is suspect.

Genus: *Barilius* Hamilton-Buchanan, 1822.
Species: **Barilius zambezensis** (Peters), 1852.
Distribution: Zambezi River system, southwards to the Pongolo River system.
I have examined Peters' types of *zambezensis* and they are the young of *Barilius neavii* as represented by *B. stephensoni*; *B. peringueyi* is an intermediate stage.
Synonyms: *B. neavii* Boulenger, 1907.
B. peringueyi Gilchrist & Thompson, 1913.
B. stephensoni Gilchrist & Thompson, 1913.
Jubb, 1961 (*b*).

Genus: *Engraulicypris* Günther, 1893.
Species: **Engraulicypris brevianalis** (Boulenger), 1908.
Distribution: Upper Zambezi River system southwards to Natal.
Synonym: *E. whitei* v. d. Horst, 1934.

Engraulicypris gariepinus Barnard, 1943.
Distribution: Orange River system.
Barnard, 1943.

Family: BAGRIDAE

Genus: *Gephyroglanis* Boulenger, 1899.
Species: **Gephyroglanis sclateri** Boulenger, 1901.
Distribution: Endemic, Orange River system.
Barnard, 1943.

Gephyroglanis gilli Barnard, 1943.
Distribution: Endemic, Olifants River system, S.W. Cape.
Barnard, 1943.

Genus: *Auchenoglanis* Günther, 1865
Species **Auchenoglanis ngamensis** Boulenger, 1911.
Distribution: The Upper Zambezi River system.
Gilchrist & Thompson, 1913. Jubb, 1961 (*b*).

Genus: *Leptoglanis* Boulenger, 1902.
Species: **Leptoglanis rotundiceps** (Hilgendorf), 1905.
Distribution: Middle and Lower Zambezi River systems, southwards to the Limpopo River.
Boulenger, 1911. Jubb, 1961 (*b*).

Family: CLARIIDAE

Genus: *Heterobranchus* Geoffrey St. Hilaire, 1809.
Species: **Heterobranchus longifilis** Cuvier & Valenciennes, 1840.
Distribution: Warm waters of the Middle and Lower Zambezi River systems, the Pungwe and Buzi Rivers.
Jubb, 1961 (*b*).

Genus: *Clarias* Scopoli, 1777.
Species: **Clarias gariepinus** (Burchell), 1822.
Distribution: The Zambezi River system, and rivers to the south to as far as the Orange River, and the Umtamvuna River in Natal.
Synonym: *C. capensis* Cuvier & Valenciennes, 1840.
Jubb, 1961 (*b*).

Clarias mossambicus Peters, 1852.
Distribution: Overlaps and cannot be separated from *C. gariepinus* in the Zambezi River system.
Jubb, 1961 (*b*).

Clarias ngamensis Castelnau, 1861.
Distribution: The Upper Zambezi River system.
Synonym: *Dinotopterus jallae* Gilchrist & Thompson, 1917.
Gilchrist & Thompson, 1917. Jubb, 1961 (*b*). Greenwood, 1961.

Clarias theodorae Weber, 1897.
Distribution: The Zambezi River system, southwards to the Umfolozi River system in Natal.
Jubb, 1961 (*b*).

Clarias dumerilii Steindachner, 1866.
Distribution: Reported by Pellegrin, 1936, from the Cunene River and the Cubango River (Upper Okavango), and is included because of the following species.
Boulenger, 1914.

Clarias cavernicola Trewavas, 1936.
Distribution: A stunted form of *Clarias* with degenerate eyes, peculiar to some sink holes in South West Africa, and with dimensions similar to *C. dumerilii*.
Jubb, 1958.

Family: SCHILBEIDAE
Genus: *Schilbe* Cuvier, 1817.
Species: **Schilbe mystus** (Linnaeus), 1762.
Distribution: Common in the Upper Zambezi River system, sparse in the warm waters of the Middle Zambezi River system.
Jubb, 1961 (*b*).
NOTE: Specimens from Middle Zambezi River confirmed by Dr. Trewavas, 1962, (*in litt.*).

Genus: *Eutropius* Müller & Troschel, 1849.
Species: **Eutropius depressirostris** (Peters), 1852.
Distribution: Middle and Lower Zambezi River system, southwards, the Lower Sabi River, to as far as the Pongolo River system.
Jubb, 1961 (*b*).

Family: MOCHOCIDAE
Genus: *Synodontis* Cuvier, 1817.
Species: **Synodontis zambezensis** Peters, 1852.
Distribution: The Middle and Lower Zambezi River system, in the warm waters, and southwards to the Pongolo River system.
Jubb, 1961 (*b*).
NOTE: In some populations adults have small spots on fins and body.
Synodontis nigromaculatus Boulenger, 1905.
Distribution: The Upper Zambezi River system.
Synonym: *S. melanostictus* Boulenger, 1906.
Ricardo-Bertram, 1943. (Synonomy). Jubb, 1961 (*b*).
Synodontis nebulosus Peters, 1852.
Distribution: Middle and Lower Zambezi River system.
I have examined the type of *nebulosus* and the species is valid. Previous records have confused *S. macrostigma* with *S. nebulosus*.
Jubb, 1961 (*b*).
Synodontis woosnami Boulenger, 1911.
Distribution: The Upper Zambezi River system.
There is a great variance in size of spots and spot pattern.
Synonyms: *S. macrostigma* Boulenger, 1911.
S. leopardinus Pellegrin, 1914.
S. jallae Gilchrist & Thompson, 1917.
S. thamalakanensis Fowler, 1935.
Fowler, 1935 (*b*). Jubb, 1961 (*b*).

Genus: *Chiloglanis* Peters, 1868.
Species: **Chiloglanis neumanni** Boulenger, 1911.
Distribution: Middle and Lower Zambezi River system, southwards to the Pungwe and Buzi Rivers.
Boulenger, 1911. Jubb, 1961 (*b*).
Chiloglanis fasciatus Pellegrin, 1936.
Distribution: The Upper Zambezi River system.
Pellegrin, 1936.
Chiloglanis pretoriae v. d. Horst, 1931.
Distribution: Limpopo River system.
Crass, 1960. Jubb, 1961 (*b*).

Chiloglanis anoterus Crass, 1960.
Distribution: Pongolo River system.
Crass, 1960.

Chiloglanis engiops Crass, 1960.
Distribution: Pongolo and Incomati River systems.
Crass, 1960.

Chiloglanis paratus Crass, 1960.
Distribution: The Pongolo and Incomati River systems.
Crass, 1960.

NOTE: The following two species were described by v. d. Horst in 1931:
Chiloglanis swierstrai
Chiloglanis pumilus
Both were described from the Crocodile River, Pretoria District. The types have been lost, and neither of the species has been recognised as yet.

Family: AMPHILIIDAE
Genus: *Amphilius* Günther, 1864.
Species: **Amphilius platychir** Günther, 1864.
Distribution: Zambezi River system southwards to the Mkuzi River, Natal. A most variable species.
Synonyms: *A. grandis* Boulenger, 1905.
A. hargeri Boulenger, 1907.
A. brevidorsalis Pellegrin, 1919.
A. platychir Günther, 1864, var. *cubangoensis* Pellegrin, 1936.
Crass, 1960. Jubb, 1961 (*b*). Jackson, 1961 (*c*).

Amphilius natalensis Boulenger, 1917.
Distribution: Tugela River system southwards to the Illovo River system.
Crass, 1960.

Family: MALAPTERURIDAE
Genus: *Malapterurus* Lacepede, 1803.
Species: **Malapterurus electricus** (Gmelin), 1789.
Distribution: Warm waters of the Middle and Lower Zambezi River systems, southwards to the Pungwe and Buzi Rivers.
Jubb, 1961 (*b*).

Family: ANGUILLIDAE
Genus: *Anguilla* Shaw, 1803.
Species: **Anguilla marmorata** Quoy & Gaimard, 1824.
Distribution: Middle and Lower Zambezi River system, southwards, a few reaching as far west as Knysna.
Vilh Ege, 1939. Jubb, 1961 (*a*).

Anguilla nebulosa labiata Peters, 1852.
Distribution: The predominant eel of east coast rivers of Africa north of the Pungwe River, becoming less common south of this with a few specimens reaching as far west along the south coast as Knysna.
Synonym: *Anguilla macrophthalma* Peters, 1852
Vilh Ege, 1939. Jubb, 1961 (*a*).
NOTE: *A. marmorata* and *A. n. labiata* have been recorded as *A. bengalensis* by Boulenger, and by Gilchrist & Thompson.

Anguilla mossambica Peters, 1852.
Distribution: The predominant eel of the east coast rivers south of the Pungwe River, southwards and along the south coast to the Breede River, a few specimens reach as far as the S.W. Cape.
Synonym: *Anguilla capensis* Kaup, 1859.
Vilh Ege, 1939. Jubb, 1961 (*a*).

Anguilla bicolor bicolor McClelland, 1845.
Distribution: Widely distributed, but not common, rivers of the east coast, southwards to the south coast as far west as Knysna. Found near the sea only.
Synonym: *Anguilla virescens* Peters, 1852.
Vilh Ege, 1939. Jubb, 1961 (*a*).
NOTE: In Gilchrist & Thompson this species is referred to as *A. australis* Richardson, 1841.

Anguilla obscura Günther, 1871.
Distribution: Buffalo River, S.E. Cape.
Vilh Ege, 1939. Jubb, 1961 (*a*).

Family: CYPRINODONTIDAE
Genus: *Nothobranchius* Peters, 1868.
Species: **Nothobranchius orthonotus** (Peters), 1844.
Distribution: Zambezi River system, southwards to the Mkuzi River, Natal.
Synonym: *Fundulus mkuziensis* Fowler, 1934.
Fowler, 1934 (*a*). Jubb, 1961 (*b*).

Genus: *Aplocheilichthys* Bleeker, 1863.
Species: **Aplocheilichthys johnstonii** (Günther), 1893.
Distribution: Zambezi River system, southwards to the Limpopo River system where restricted to the warm waters.
Synonym: *A. chobensis* Fowler, 1935.
Fowler, 1935 (*b*). Jubb, 1961 (*b*).
NOTE: Fowler's diagram of *A. chobensis* does not agree with his description. Chobe River material has produced just two species, *A. johnstonii* and *A. katangae*.

Aplocheilichthys katangae (Boulenger), 1912.
Distribution: Zambezi River system, southwards in warm waters to the Umfolozi River, Natal.
Synonym: *Haplochilus carlislei* v. d. Horst, 1934.
Jubb, 1961 (*b*).

Aplocheilichthys cabindae (Boulenger), 1911.
Distribution: Headwaters of Upper Zambezi River system.

Aplocheilichthys myaposae (Boulenger), 1908.
Distribution: Warm waters of Natal.
Crass, 1962 (*in litt.*). Trewavas, 1962 (*in litt.*).

Family: CICHLIDAE
Genus: *Tilapia* A. Smith, 1840.
Species: **Tilapia placida** Trewavas, 1941.
Distribution: Warm waters of the Lower Zambezi River system, southwards to the Lower Sabi River.
Jubb, 1961 (*b*).

Tilapia macrochir Boulenger, 1912.

Distribution: Upper Zambezi River system.

Synonyms: *T. sheshekensis* Gilchrist & Thompson, 1917.
T. alleni Fowler, 1931.
Gilchrist & Thompson, 1917. Fowler, 1931. Jubb, 1961 (*b*).

NOTE: *T. macrochir* has been introduced into Lake Kariba of the Middle Zambezi River system.

Tilapia andersonii (Castelnau), 1861.

Distribution: Upper Zambezi River system.

Synonyms: *T. kafuensis* Boulenger, 1912.
T. intermedia Gilchrist & Thompson, 1917.
Barnard, 1948, (Synonymy). Mortimer, 1959, (Synonymy). Jubb, 1961 (*b*).

Tilapia mossambica Peters, 1852.

Distribution: Middle and Lower Zambezi River system, southwards to the Pongolo River system, thereafter restricted to warmer waters near the sea to as far as the Bushmans River, S.E. Cape, where it is found in both fresh and estuarine waters.

Synonyms: *T. natalensis* Weber, 1897.
T. vorax Pfeffer, 1893.
T. arnoldi Gilchrist & Thompson, 1917.
Barnard, 1948, (Synonymy). Jubb, 1961 (*b*).

Tilapia sparrmanii A. Smith, 1840.

Distribution: Zambezi River system, southwards to the Buffalo River, S.E. Cape, and the Olifants River, S.W. Cape, including the Orange River system.

Synonyms: *T. deschauenseei* Fowler, 1931.
T. guinasana Trewavas, 1936.
Barnard, 1948, (Synonymy). Jubb, 1961 (*b*).

Tilapia melanopleura Dumeril, 1859.

Distribution: Zambezi River system southwards to the Pongolo River system.

Synonyms: *T. druryi, T. swierstrae, T. mackeani, T. sykesii* and *T. kirkhami*, all Gilchrist & Thompson, 1917. Barnard, 1948 (Synonymy). Jubb, 1961 (*b*).

Genus: *Hemichromis* Peters, 1857.

Species: **Hemichromis fasciatus** Peters, 1857.

Distribution: Upper Zambezi River system.
Gilchrist & Thompson, 1917. Jubb, 1961 (*b*).

Genus: *Sargochromis* Regan, 1920.

Species: **Sargochromis codringtoni** (Boulenger), 1908.

Distribution: Upper Zambezi, and Middle Zambezi River system.

Synonym: *P. marginata* Gilchrist & Thompson, 1917.
Gilchrist & Thompson, 1917. Regan, 1922. Jubb, 1961 (*b*).

Genus: *Serranochromis* Regan, 1920.
Species: **Serranochromis robustus** (Günther), 1864.
Distribution: Upper Zambezi River system.
Synonyms: *Pelmatochromis genisquamulatus* Pellegrin, 1914.
Pelmatochromis ngamensis Gilchrist & Thompson, 1917.
Paratilapia zambezensis Gilchrist & Thompson, 1917.
Mortimer, 1960, unpublished data, (Synonymy). Jubb, 1961 (*b*).

Serranochromis macrocephala (Boulenger), 1899.
Distribution: Upper Zambezi River system.
Synonyms: *Paratilapia longimanus* Boulenger, 1911.
Paratilapia ellenbergeri Gilchrist & Thompson, 1917.
Jubb, 1961 (*b*).

Serranochromis levaillantii (Castelnau), 1861.
Distribution: Upper Zambezi River system.
Synonyms: *Paratilapia angusticeps* Boulenger, 1907.
Paratilapia kafuensis Boulenger, 1908.
Gilchrist & Thompson, 1917, (*P. angusticeps*).
Jubb, 1961 (*b*), (*S. angusticeps*).

Serranochromis thumbergi (Castelnau), 1861.
Distribution: Upper Zambezi River system.
Mortimer, 1960, unpublished data. Jubb, 1961 (*b*).

Genus: *Chetia* Trewavas, 1961.
Species: **Chetia flaviventris** Trewavas, 1961.
Distribution: The Transvaal tributaries of the Limpopo River, and the Sabie River of the Incomati system. Confused with *Serranochromis thumbergi*.
du Plessis, 1956. Jubb, 1961 (*b*).

Genus: *Haplochromis* Hilgendorf, 1888.
Species: **Haplochromis carlottae** (Boulenger), 1905.
Distribution: Upper Zambezi River system.
Synonym: *Paratilapia gibbiceps* Boulenger, 1911.
Gilchrist & Thompson, 1917. Jubb, 1961 (*b*).

Haplochromis frederici (Castelnau), 1861.
Distribution: Upper Zambezi River system.
Synonym: *Pelmatochromis robustus* Gilchrist & Thompson, 1917.
Gilchrist & Thompson, 1917. Jubb, 1961 (*b*).

Haplochromis jallae (Boulenger), 1896.
Distribution: A single specimen from above the Victoria Falls, Zambezi River, but no further specimens have been recognised.
Dr. Trewavas (*in litt.*) has informed me that she has examined the type and it is valid. Close to, but can be separated from *H. darlingi* (Boulenger), 1911. For description see Gilchrist & Thompson, 1917.

Haplochromis darlingi (Boulenger), 1911.
Distribution: Zambezi River system, southwards to the Limpopo River system.
Synonyms: *Paratilapia arnoldi* Gilchrist & Thompson, 1917.
Tilapia rumsayi Gilchrist & Thompson, 1917.
Astatotilapia ellenbergeri Pellegrin, 1920.
Jubb, 1961 (*b*).

Haplochromis philander (M. Weber), 1897.
Distribution: The Zambezi River system, southwards to the Uvongo River, Natal, in the east, and the Orange River system in the west.
Synonym: *H. moffati* (non-Castelnau, 1861) Boulenger, 1907.
Trewavas, 1936. (Discusses two sub-species from South West Africa, *H. philander dispersus* Trewavas, 1936 and *H. philander luebberti* (Hilgendorf), 1902.)
Barnard, 1948, (*H. moffati.*). Jubb, 1961 (*b*).
Haplochromis swynnertoni (Boulenger), 1907.
Distribution: Lower Pungwe River, southwards to the Lower Sabi River.
Jubb, 1961 (*b*).

Family: ANABANTIDAE.
Genus: *Sandelia* Castelnau, 1861.
Species: **Sandelia capensis** (Cuvier & Valenciennes), 1831.
Distribution: The Berg River system of the S.W. Cape, eastwards to the Zwartkops River, S.E. Cape.
Synonym: *Anabas vicinus* Boulenger, 1916.
Barnard, 1943.
Sandelia bainsii Castelnau, 1861.
Distribution: The Kowie, Buffalo and Nahoon River systems, S.E. Cape.
Barnard, 1943.
Genus: *Ctenopoma* Peters, 1844.
Species: **Ctenopoma multispinis** Peters, 1844.
Distribution: Upper Zambezi River system, entirely absent from the Middle Zambezi River system although described from Quelimane, Portuguese East Africa.
Synonyms: *Anabas rhodesianus* Gilchrist & Thompson, 1917.
Anabas vernayi Fowler, 1935.
Fowler, 1935 (*b*). Jubb, 1961 (*b*).
Ctenopoma ctenotis (Boulenger), 1919.
Distribution: Headwaters Upper Zambezi River system.
Jackson, 1961 (*c*).

Family: GOBIIDAE
Two species are found up to 400 miles inland by river from the sea.
Genus: *Platygobius* Bleeker, 1874.
Species: **Platygobius aeneofuscus** (Peters), 1852.
Distribution: East coast, and found far inland in rivers of Southern Rhodesia and Transvaal.
J. L. B. Smith, 1960. Jubb, 1961 (*b*).
Genus: *Glossogobius* Gill, 1862.
Species **Glossogobius giuris** (Hamilton-Buchanan), 1822.
Distribution: East coast and S.E. Cape coast rivers. Found far inland in Southern Rhodesia.
Barnard, 1943, (*Gobius giuris*). J. L. B. Smith, 1960. Jubb, 1961 (*b*), (*G. giurus*).

Family: MASTACEMBELIDAE
Genus: *Mastacembalus* Scopoli, 1777.
In both colour patterns and fin ray counts individual specimens of *Mastacembalus* from above the Victoria Falls have been found to be extremely variable.

Species: **Mastacembalus mellandi** Boulenger, 1914.
Distribution: Upper Zambezi River system.
Synonym: *M. thompsoni* Boulenger, 1917.
Gilchrist & Thompson, 1917. Jubb, 1961 (*b*).

Mastacembalus mutombotombo Pellegrin, 1936.
Described from a single specimen from the Cubango River, has a very low ray count, otherwise similar to *M. mellandi*.

Gazetteer of rivers mentioned, with approximate Longitude and Latitude of river mouth or confluence with a major system.

Berg River	Long. 18° 12′ E.	Lat. 32° 45′ S.
Breede River	20° 50′ E.	34° 25′ S.
Buffalo River	27° 55′ E.	33° 02′ S.
Bushmans River	26° 42′ E.	33° 42′ S.
Buzi River	34° 45′ E.	19° 50′ S.
Chobe River (Zambezi system)	25° 10′ E.	17° 45′ S.
Crocodile River (Limpopo system) ...	27° 35′ E.	25° 20′ S.
Cubango River (Zambezi system)	18° 40′ E.	17° 40′ S.
Cunene River	12° 00′ E.	17° 15′ S.
Gamtoos River	24° 55′ E.	34° 00′ S.
Gouritz River	21° 56′ E.	34° 20′ S.
Incomati River	32° 38′ E.	25° 45′ S.
Kowie River	27° 55′ E.	33° 35′ S.
Kromme River	24° 50′ E.	34° 10′ S.
Limpopo River	34° 00′ E.	25° 20′ S.
Lundi River	32° 35′ E.	21° 15′ S.
Malagas River	22° 30′ E.	34° 05′ S.
Mashi River, Kwando River (Zambezi system)	23° 15′ E.	17° 30′ S.
Mkuzi River	32° 28′ E.	27° 50′ S.
Nahoon River	28° 00′ E.	32° 58′ S.
Olifants River, S.W. Cape	18° 15′ E.	31° 40′ S.
Olifants River (Limpopo system)	32° 35′ E.	24° 04′ S.
Orange River	16° 30′ E.	28° 35′ S.
Pongolo River	32° 40′ E.	26° 20′ S.
Pungwe River	34° 45′ E.	19° 45′ S.
Sabi River	35° 00′ E.	20° 52′ S.
Sabie River	32° 17′ E.	25° 20′ S.
Swartkops River	25° 40′ E.	33° 55′ S.
Tugela River	31° 35′ E.	29° 10′ S.
Umbeluzi River	32° 30′ E.	26° 00′ S.
Umfolozi River	32° 25′ E.	28° 25′ S.
Umgusa River	27° 45′ E.	19° 30′ S.
Umhlatuzi River	32° 00′ E.	28° 45′ S.
Umkomaas River	30° 50′ E.	30° 12′ S.
Umtamvuna River	30° 12′ E.	31° 05′ S.
Umvoti River	31° 15′ E.	29° 22′ S.
Uvongo River	30° 20′ E.	30° 45′ S.
Vaal River	23° 38′ E.	29° 05′ S.
Witte River, (Sundays River system) ...	25° 40′ E.	33 30′ S.
Zambezi River...	36° 20′ E.	18° 30′ S.

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In the study of the taxonomy of the fishes listed above a stage was reached where, without expert opinion from the British Museum (Natural History) and the examination of type material housed therein, little progress could be made. I am therefore greatly indebted to Dr. P. H. Greenwood who devoted so much time to my many problems relating to *Barbus* and *Labeo*, and to Dr. E. Trewavas for information relating to *Schilbe*, *Eutropius* and *Aplocheilichthys*. Mr. P. J. P. Whitehead very kindly supplied data and material relating to *Synodontis*.

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Mrs. R. McConnell presented a collection of fishes from Maun, Bechuanaland; Mr. Paul Scheide a collection from South West Africa and Bechuanaland; Mr. B. Donnelly of Bulawayo *Chiloglanis* from the Limpopo River system; the Veterinary Department, Swaziland, specimens from Swaziland rivers and Mr. R. Jensen of Pretoria a collection from the Mogul River and Mozambique Territory. A large collection of fishes from the headwaters of the Upper Zambezi River, presented by Mr. G. Bell-Cross of Northern Rhodesia, contained four new records for that area.

I am indebted to the Berlin Museum, the South African Museum and the Transvaal Museum for the loan of type specimens.

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ADDENDUM

(1) The following species, as recorded by Gilchrist & Thompson, are considered to be misidentifications:

Marcusenius isidori (Cuvier & Valenciennes), 1846
Gnathonemus angolensis Boulenger, 1905.
Pantodon buchholzi Peters, 1876.
Micralestes humilis Boulenger, 1899.
Barbus kerstenii Peters, 1868.
Amphilius longirostris Boulenger, 1901.
Tilapia galilaea (Artedi), 1757.
Tilapia squamipinnis (Günther), 1864.
Tilapia calliptera (Günther), 1893.
Tilapia livingstonii (Boulenger), 1899.
Petrochromis andersonii Boulenger, 1901.
Haplochromis desfontainesii (Lacepede), 1802.
Pelmatochromis spekii Boulenger, 1906.
Anabas nanus (Günther), 1896.

(2) New Species of *Labeo*:

Reference the note below *Labeo cylindricus* I have been informed (*in litt.*) that the description of this new species, *Labeo molybdinus*, by du Plessis, will appear in the Annals of the Transvaal Museum, Vol. 24, part 4, 1963.

(3) The status of the following species from the Upper Zambezi River it still being investigated:

Tilapia giardi Pellegrin, 1904.
Tilapia acuticeps (Steindachner), 1866.
Tilapia woosnami Boulenger, 1911.

(4) Types of the following new species, each described from a single specimen, have not been examined (*Occ. Pap. Nat. Mus. S. Rhodesia, No. 26B, pp. 780—784*):

Marcusenius smithersi Määr, 1962, closely related to *M. discorhynchus* (Peters), 1852.
Gnathonemus rhodesianus Määr, 1962, closely related to *G. macrolepidotus* (Peters), 1852.
Barbus hondeensis Määr, 1962, closely related to *B. manicensis* Pellegrin, 1919.

(5) To synonomy of *Tilapia sparrmanii* add *Chromys moffatii* Castelnau, 1861, and *Tilapia ovalis* Steindachner, 1866. Steindachner's original illustration of *ovalis* is of a *Tilapia* but Boulenger's illustration (1915, p. 208) is of *Haplochromis philander* (Weber), 1897.

(6) From an examination of the type specimen Mr. B. Turner (*in litt* 1963) has concluded that *Fundulus mkuziensis* Fowler, 1934, is not a synonym of *Nothobranchius orthonotus*.

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A new species of *Labeo* (Pisces, Cyprinidae) from the Upper Zambezi River

(*Accepted 1st June, 1962*)

Using live material adult *Labeo* of southern Africa can be divided into three main groups:

I. Those with tubercles on the snout, visible to the naked eye, which are bright red in colour in the case of fish taken from clear water; pink or putty coloured if taken from muddy water.

II. Those with tubercles on the snout, visible to the naked eye, which are the same general colour as that of the head itself.

III. Those with minute tubercles on the snout which are not visible to the naked eye. (*L. quathlambae* has tubercles on the top of the head.)

The closely related species *L. altivelis* and *L. rosae* fall into the first group, and, to a lesser degree due to fewer and paler tubercles, *L. ruddi*. These species do not have small papillae in transverse rows on the inside of the upper and lower lips, but the lips are fringed with coarse papillae. There is a single small barbel on each side of the mouth. In preserved material the red colour of the tubercles fades rapidly.

To the second group belong *L. congoro*, *L. rubropunctatus*, *L. cylindricus* and the new species described below. All of these have numerous transverse rows of small papillae in the form of plicae on the inside of the upper and lower lips. There is a single small barbel on each side of the mouth.

The third group can be divided into:

(*a*) Those with transverse rows of small papillae in the form of plicae on the inside of the upper lip, the lower lip being covered with coarse papillae, such as *L. capensis*, *L. rubromaculatus* and *L. seeberi*.

(*b*) A species such as *L. umbratus* in which both upper and lower lips are covered with coarse papillae.

(*c*) *L. quathlambae* which has feebly papillose lips.

L. quathlambae has a single barbel on each side of the mouth; *L. seeberi* has also a single barbel, very small and hidden. *L. capensis*, *L. rubropunctatus* and *L. umbratus* have two barbels on each side of the mouth.

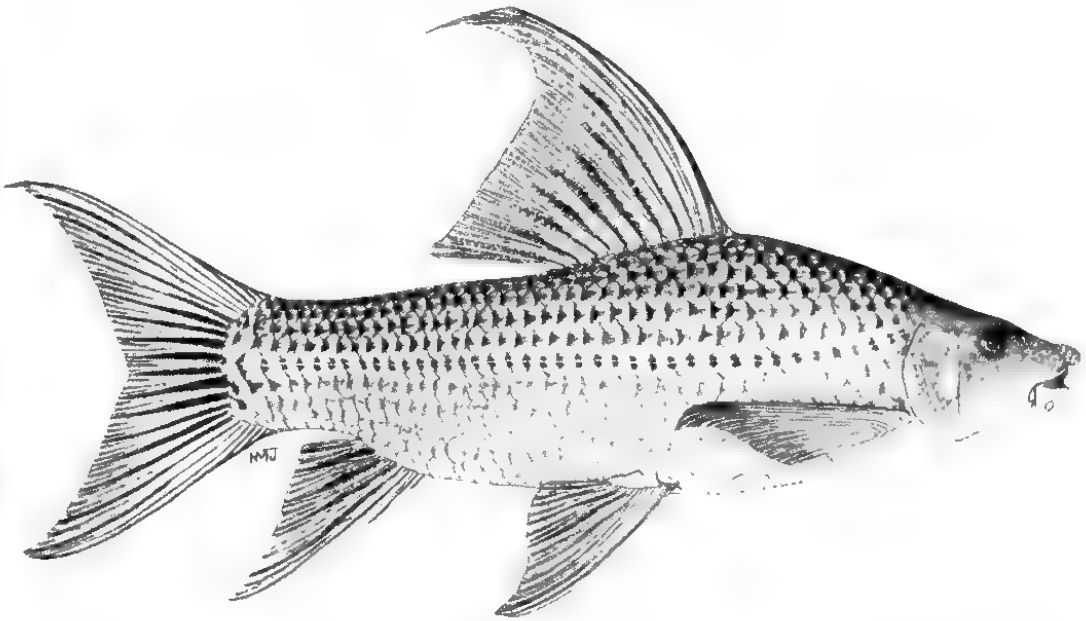
To group II would belong *L. forskalii*, to which species specimens of *Labeo* from the Zambezi River above the Victoria Falls have been assigned by Gilchrist and Thompson (1911), Barnard (1948), Jackson (1961) and Jubb (1958), (1961). Barnard (1948) made certain reservations, and, in 1959 when the writer collected fresh material at a site about 23 miles above the Victoria Falls, particular attention was paid to this remarkable *Labeo*. From this fresh

material a typical specimen was selected and sent late last year to Dr. P. H. Greenwood of the British Museum, an authority on African cyprinids, for detailed examination and comparison with *L. forskalii* material. This he very kindly carried out and his letter of the 9th February, 1962, makes it quite clear that the specimen sent to him cannot be assigned to *Labeo forskalii*. As no other description fits this *Labeo* it is now described as a new species.

Labeo lunatus n.sp.

1913 Gilchrist and Thompson, p. 248, fig. 19, *L. forskalii*.
1916 Boulenger, p. 205.
1936 Pellegrin, p. 51, *L. greeni*.
1948 Barnard, p. 419, *L. forskalii*.
1958 Jubb, p. 186, *L. forskalii*.
1961 Jubb, p. 102, fig. 43, *L. forskalii*.
1961 Jackson, p. 55, *L. forskalii*.

Type No. P.F. 652, Albany Museum, Grahamstown, 244 mm. standard length, collected 23 miles above the Victoria Falls, Zambezi River, August, 1959.



Labeo lunatus n.sp. Type X 2/5.

DESCRIPTION. In percentage of standard length: fork length 113 -116, depth 26 (young - 32 (adult), head 21—25, eye 3·0 (adult)—6·0 (young), snout 9 —11, interorbital width 12 —13, post-ocular distance 9 12, peduncle depth 13—16. Snout tip to origin of dorsal fin 43 —49, to origin of ventral 53—57, to origin of anal 80 —84. Longest ray of dorsal fin measured along ray 39 (young)—54 (adult), of pectoral fin 23 (young)—30 (adult), of ventral fin 21 (young) - 29 (adult), of anal fin 20 (young)—29 (adult). Measurements taken from type and seven paratypes 95—288 mm. standard length.

Gill-rakers fine, closely set, 50—55 on entire arch. Pharyngeal teeth stout, in three series 3,3,5 5,3,3. Number of scales along lateral line 38, range 37—39, 6 scales from origin of dorsal fin to lateral line, 4 scales from lateral line to origin of ventral fin, 18 scales around caudal peduncle, range 16 (young)—20 (adult). Dorsal fin IV 10, last branched ray double, anal fin III 5, last branched ray double.

The body is compressed. The snout is prominent, rounded and projecting beyond mouth with tubercles or scars on sides. The eye is supero-lateral and the interorbital space broad and flat. The lips are well developed, the edge of the upper straight but that of the lower lip fringed with coarse papillae; inner surface of both upper and lower lips with numerous small papillae in the form of transverse rows or plicae; rostral flap denticulate; a minute barbel on each side of the mouth concealed under folds of skin. Insertion of ventral fin under fourth branched ray of dorsal. In adults the pectoral fin reaches or just reaches the origin of the ventral fin; the ventral fin nearly reaches the anal fin; the anal fin clearly reaches the caudal fin which is broad, powerful and crescentic in shape when fully opened out. The high crescent-shaped dorsal fin with its deeply concave upper margin is the most outstanding feature about this *Labeo*, a feature which is referred to in its name.

Specimens preserved in formalin are dark grey in colour, lighter on the belly, with dark centres to the scales giving the appearance of lateral stripes. Live specimens have fins and dorsal surface of dark grey, sides and belly silvery grey. The scales on the dorsal surface have dark centres with iridescent green tints, those along the sides being lighter with some iridescent pink colouring.

The largest recorded specimen is one of 335 mm. standard length from the Okavango River. (Barnard, 1948.)

The fresh specimens of *L. lunatus* collected in 1959 were taken in a quiet back-water off the main stream of the Zambezi River. Intestinal contents contained fine plant debris and mud.

L. lunatus differs from *L. forskalii*, which is also described by Sandon (1950) and Greenwood (1956), in being deeper, having longer pectoral, ventral and anal fins, having a higher dorsal fin, having a shorter caudal peduncle and a mean scale count of 18 around the caudal peduncle. In *L. forskalii* the mean count around the caudal peduncle is 16 rows of scales. *L. lunatus* greatly resembles *L. weeksii* in appearance as illustrated in Boulenger (1909, p. 310), but this species is described as having both lips with several rows of conical papillae, the outer forming a strong fringe, and the edge of the rostral flap being entire, characteristics which have been confirmed by Greenwood. *L. lunatus* is closely related to *L. falcipinnis* (Boulenger, 1909, p. 327), a species having small papillae forming transverse plicae on the inner surface of both upper and lower lips, but differs in having a shorter head, a smaller eye and a more slender caudal peduncle.

Material cited by Barnard (1948), and that examined or collected personally, indicates that this species is found in the Upper Zambezi River itself, as well as the Mashi River (Kwando R.), the Okavango River (Cubango R.), and the Chobe River. The two specimens mentioned by Barnard (1948) as coming from Sawmills were presented by F. D. McKean whose specimens, as pointed out by Jubb (1960), must have come from the Zambezi River above the Victoria Falls.

In the type locality the African name for *L. lunatus* was "Linyonga", a name which also refers to large *Barbus*.

A metatype of *L. lunatus* has been presented to the British Museum (Natural History), London.

I wish to thank Dr. P. H. Greenwood of the British Museum for his valuable assistance in examining material and reading this paper. Fresh material of *L. lunatus* was collected during field work sponsored by the Department of Wildlife Conservation and the National Museums of Southern Rhodesia. The laboratory work was part of a research programme sponsored by the Council for Scientific and Industrial Research, Pretoria. The illustration of the type of *L. lunatus* is a copy of one in colour prepared by Mrs. Hilda M. Jubb.

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EAST LONDON MUSEUM.

Birds of the State Alluvial Diamond Diggings from Holgat to Orange River Mouth

(*Accepted 12th June, 1962*)

1. INTRODUCTION: These records were made during three field collecting trips to the State Alluvial Diggings, Alexander Bay (protected area) as per accompanying map of area. Visual records were made, and specimens collected where necessary, while operating for the Museum in July 1958, August 1958, and August 1960.

   THANKS: I am deeply indebted to the Manager, Mr. D. B. Smit, who kindly assisted us by allowing us to collect in this restricted area under police control. Gratitude is also due to Mr. G. G. Smith, Chairman of the East London Museum Board of Trustees, for organising and making these trips possible. My appreciation is also extended to Mr. P. A. Clancey, Director of the Durban Museum and Art Gallery, for reading and correcting rough drafts of the MS.

2. PREVIOUS LISTS: Mr. Darrel C. H. Plowes refers to 70 species in his list made at the Orange River Mouth, in the *Ostrich*, Vol. XIV, No. 3, November 1943, and J. R. Grindly, M.Sc., Zoology Department, University of Cape Town, in his list "Birds of the Orange River Estuary", in the *Ostrich*, Vol. XXX, No. 3, September 1959. I would like to add that it is interesting to note that they recorded four species of Tern, whilst we only recorded the Damara Tern. I have also included birds recorded within this area by Winterbottom and Courtenay-Latimer in "The South African Avifauna Series", No. 1, 1961.

3. NOMENCLATURE AND GENERAL TREATMENT: I have followed Roberts Revised "Birds of Southern Africa" and Jack Vincent's Check List. After the English name of each species I have used Vincent's and Roberts' numbers.

4. Records of breeding birds were made chiefly from nests and eggs found at the time.

5. CLIMATE: Along the banks the vegetation is lush and green, with tall acacia and willow predominating. The open plains are dry and vegetation is almost altogether wanting, except for a few low scrubby thorn bushes here and there, which provide the only cover for some species in the area. The mean annual rainfall is 2·51 inches supplemented by frequent sea fogs. Scorching easterly winds of very high velocity occur with frequency, more especially during the winter months, causing a great deal of movement and intermingling of the bird populations. We collected along the coast, including a strip of about two miles inland, along the Holgat River and on the banks and at the mouth of the Orange River. An average height above sea level of 40 feet. Latitude 28° 37 S., Longitude 16° 19° E.

SYSTEMATIC LIST OF BIRDS

1. OSTRICH (V1, R1)
   Struthio camelus australis Gurney. Not recorded on any one of our trips to Alexander Bay. (List Winterbottom/Courtenay-Latimer).
2. GREAT CRESTED GREBE (V7, R4)
   Podiceps cristatus infuscatus Salvadori. Six records in August 1957; three recorded 15/8/1960. All sight records on the pools near the Main Office at Alexander Bay.
3. BLACK-NECKED GREBE (V8, R5)
   Podiceps nigricollis gurneyi (Roberts). Extremely common. Recorded in large parties. Breeding; young well advanced in growth.
4. CAPE DABCHICK (V9, R6)
   Podiceps ruficollis capensis Salvadori. Recorded in small parties. Observed on pools near Main Office.
5. WHITE PELICAN (V69, R42)
   Pelecanus onocrotalus Linnaeus. Party of 22. Observed Orange River Mouth.
6. WHITE-BREASTED CORMORANT (V60, R47)
   Phalacrocorax carbo lucidus (Lichtenstein). Observed in small parties near Orange River Mouth.
7. CAPE CORMORANT (V61, R48)
   Phalacrocorax capensis (Sparrman). Not common, observed in small parties of two to three birds only along Alexander Bay coast.
8. BANK CORMORANT (V62, R49)
   Phalacrocorax neglectus (Wahlberg). Common in fairly large parties.
9. REED CORMORANT (V63, R50)
   Phalacrocorax africanus africanus (Gmelin). Fairly plentiful, observed in parties along river.
10. DARTER (V66, R52)
    Anhinga rufa rufa (Lacépède et Daudin). Sight record along Orange River. Not plentiful.
11. GREY HERON (V71, R54)
    Ardea cinerea cinerea Linnaeus. Observed singly or in pairs along Orange River.
12. BLACK-HEADED HERON (V72, R55)
    Ardea melanocephala Vigors & Children. Not common, observed along Orange River.
13. LITTLE EGRET (V78, R59)
    Egretta garzetta garzetta (Linnaeus). Single bird observed at pools near Main Office.
14. YELLOW-BILLED EGRET (V76, R60)
    Egretta intermedia brachyrhyncha (Brehm). One bird observed on mud banks along Orange River.
15. CATTLE EGRET (V–, R–)
    Ardeola ibis ruficrista (Bonaparte). Not common, three observed near Main Office roosting on wattle trees.
16. HAMERKOP (V89, R72)
    Scopus umbretta bannermani C. Grant. Single bird observed near mouth of Orange River.
17. WHITE STORK (V90, R80)
    Ciconia ciconia ciconia (Linnaeus). Grootderm. Rare (List Winterbottom/Courtenay-Latimer).
18. BLACK STORK (V91, R79)
    Ciconia nigra (Linnaeus). Five birds observed soaring above mouth of Holgat River.

19. Wood Ibis (V97, R76)
Ibis ibis (Linnaeus). Orange River Mouth. (List Winterbottom/Courtenay-Latimer).
20. Sacred Ibis (V98, R81)
Threskiornis aethiopicus aethiopicus (Latham). Eight birds recorded near mouth of Orange River.
21. Greater Flamingo (V104, R86)
Phoenicopterus ruber roseus Pallas. Large flocks occur at mouth of Orange River, observed also at pools near Main Office.
22. Lesser Flamingo (V105, R87)
Phoeniconaias minor (Geoffroy). Observed feeding with Greater Flamingo. Plentiful.
23. South African Shelduck (V108, R90)
Tadorna cana (Gmelin). Observed in a small flock at mouth of river.
24. Egyptian Goose (V109, R89)
Alopochen aegyptiacus (Linnaeus). Not plentiful, observed in a party of three feeding on muddy pools behind Main Office.
25. Cape Shoveller (V117, R94)
Anas smithii (Hartert). Two observed feeding on pools near Main Office.
26. Yellowbill (V110, R96)
Anas undulata undulata Dubois. Fourteen counted on stretch of water near mouth of river.
27. Red-bill Teal (V114, R97)
Anas erythrorhyncha Gmelin. Common on water pools behind Main Office.
28. Cape Wigeon or Teal (V112, R98)
Anas capensis Gmelin. Large parties on stretch of water near mouth of river.
29. White-faced Duck (V106, R100)
Dendrocygna viduata (Linnaeus). Alexander Bay. Not common. (List Winterbottom/Courtenay-Latimer).
30. Maccoa Duck (V122, R103)
Oxyura jamaicensis punctata (Burchell). Observed party of three 7 8 1957. Not recorded 1960 visit.
31. Secretary Bird (V124, R105)
Sagittarius serpentarius (Miller). Not common. (List Winterbottom Courtenay-Latimer).
32. Cape Vulture (V125, R106)
Gyps coprotheres (Forester). Rare. (List Winterbottom/Courtenay-Latimer).
33. Lanner Falcon (V183, R114)
Falco biarmicus biarmicus Temminck. Fairly common, usually in pairs.
34. Greater Kestrel (V193, R122)
Falco rupicoloides rupicoloides Smith. Not common. Birds observed along the rocky coast of Reserve.
35. Rock Kestrel (V192, R123)
Falco tinnunculus rupicolus Daudin. Not common, one sight record only.
36. Black Kite (V131, R128)
Milvus migrans migrans (Boddaert). Observed near settlement on 16 8/1960 at 9 a.m. Solitary migrant. Very distinctive call and easily recognised by very black bill.
37. Yellow-billed Kite (V132, R129)
Milvus migrans parasitus (Daudin). Three records, scattered distribution, occurring singly from Holgat River to Orange River.

38. BLACK-SHOULDERED KITE (V133, R130)
Elanus caeruleus caeruleus (Desfontaines). Alexander Bay, not common. (List Winterbottom/Courtenay-Latimer).
39. MARTIAL EAGLE (V145, R142)
Polemaetus bellicosus (Daudin). Grootderm, rare migrant? (List Winterbottom/ Courtenay-Latimer).
40. BLACK-BREASTED HARRIER-EAGLE (V150, R146)
Circaëtus pectoralis Smith. Alexander Bay. (List Winterbottom/Courtenay-Latimer).
41. JACKAL BUZZARD (V161, R152)
Buteo rufofuscus rufofuscus (Forester). Common at Holgat River.
42. CHANTING GOSHAWK (V–, R–)
Melierax musicus argentior Clancey. Breeding, found nest with eggs 9th August, 1960. Very common.
43. PALLID HARRIER (V176, R168)
Circus macrourus (Gmelin). Rare migrant. (List Winterbottom Courtenay-Latimer).
44. AFRICAN MARSH HARRIER (V178, R167)
Circus ranivorus ranivorus (Daudin). One bird observed over swamp behind Main Office.
45. BLACK HARRIER (V174, R169)
Circus maurus (Temminck). Two birds observed near mouth of river.
46. ORANGE RIVER FRANCOLIN (V216, R179)
Francolinus g. gariepensis Smith. Observed along vegetation of Orange River, not common, extremely wild.
47. KORI BUSTARD (V244, R217)
Ardeotis kori kori (Burchell). Rare. Mr. D. B. Smith reports that it is known to occur in the area under review at certain seasons of the year.
48. AFRICAN MOORHEN (V282, R210)
Gallinula chloropus meridionalis (Brehm). Observed in reeds behind Main Office.
49. RED-KNOBBED COOT (V284, R212)
Fulica cristata Gmelin. Common on water behind Main Office.
50. BLACK OYSTERCATCHER (V288, R231)
Haematopus moquini Bonaparte. Observed pair along rocky coast at Holgat river mouth.
51. TURNSTONE (V327, R232)
Arenaria interpres interpres (Linnaeus). Observed small flocks at mouth of Orange River.
52. CURLEW (V335, R267)
Numenius arquata arquata (Linnaeus). Not common, isolated birds along coast.
53. RINGED PLOVER (V292, V233)
Charadrius hiaticula tundrae (Lowe). Orange River Mouth, not common.
54. WHITE-FRONTED SANDPLOVER (V294, R235)
Charadrius alexandrinus marginatus Vieillot. Extremely common along coast.
55. CHESTNUT-BANDED SANDPLOVER (V296, R236)
Charadrius pallidus pallidus Strickland. Common, observed in flocks at mouth of Orange River.
56. KITTLITZ'S SANDPLOVER (V297, R237)
Charadrius pecuarius Temminck. Very common, observed usually in pairs.
57. THREE-BANDED SANDPLOVER (V298, R238)
Charadrius tricollaris tricollaris Vieillot. Common at all pools of water and along river banks. Visual and specimen records.

58. GREAT SANDPLOVER (V300, R239)
Charadrius leschenaultii Lesson. One bird observed at mouth of Orange River.
59. CROWNED PLOVER (V–, R -)
Stephanibyx coronatus xerophilus (Clancey). Not common, one pair observed near Oppenheimer Bridge, near Orange River Mouth. Easily recognised by its pale colour, which blends with the light soil and is difficult to see.
60. BLACKSMITH PLOVER (V307, R245)
Hoplopterus armatus (Burchell). Three birds observed in lucerne patch on banks of Orange River.
61. LITTLE STINT (V322, R253)
Calidris minuta (Leisler). Fairly plentiful at Orange River Mouth.
62. SANDERLING (V325, R255)
Crocethia alba (Pallas). Observed in small flock at Orange River Mouth.
63. RUFF (V326, R256)
Philomachus pugnax (Linnaeus). Rare migrant. (List Winterbottom Courtenay-Latimer).
64. COMMON SANDPIPER (V312, R258)
Tringa hypoleucos Linnaeus. Fairly common along coast.
65. MARSH SANDPIPER (V317, R262)
Tringa stagnatilis Bechstein. Not common, observed two isolated birds.
66. GREENSHANK (V318, R263)
Tringa nebularia Gunnerus. Not common, observed one bird near mouth of Orange River.
67. WOOD SANDPIPER (V319, R264)
Tringa glareola Linnaeus. Quite plentiful.
68. CURLEW SANDPIPER (V320, R251)
Calidris testacea (Pallas). Small flocks at mouth of Orange River.
69. AVOCET (V290, R269)
Recurvirostra avosetta Linnaeus. Six birds observed near mouth of Orange River.
70. BLACK-WINGED STILT (V289, R270)
Himantopus himantopus himantopus (Linnaeus). Five birds observed at mouth of Orange River.
71. CAPE DIKKOP (V264, R275)
Burhinus capensis capensis (Lichtenstein). Fairly plentiful.
72. WATER DIKKOP (V266, R274)
Burhinus vermiculatus vermiculatus (Cabanis). Not common. Grootderm. (List Winterbottom/Courtenay-Latimer).
73. SPOTTED CRAKE (V273, R201)
Porzana porzana (Linnaeus). Observed on weed fringed pool at Alexander Bay settlement on 5/8/1958.
74. DOUBLE-BANDED COURSER (V342, R278)
Rhinoptilus africanus africanus (Temminck). Not common, observed on open dry flats.
75. BLACK-BACKED GULL (V356, R287)
Larus dominicanus Lichtenstein. Common along coast.
76. GREY-HEADED GULL (V357, R288)
Larus cirrocephalus Vieillot. Plentiful, ravages dirt boxes at the settlement.
77. HARTLAUB'S GULL (V358, R289)
Larus hartlaubii (Bruch). Common, more especially along coast.

78. CASPIAN TERN (V360, R290)
Hydroprogne tschegrava tschegrava (Lepechin). Not sighted on any visit to this area but recorded by J. R. Grindley (*vide Ostrich*, Vol. XXX, No. 3, Sept. 1959).
79. DAMARA TERN (V372, R300)
Sterna balaenarum (Strickland). Fairly plentiful along river, in very mottled plumage.
80. NAMAQUA SANDGROUSE (V386, R307)
Pterocles namaqua namaqua Gmelin. Plentiful at water points.
81. DOUBLE-BANDED SANDGROUSE (V391, R310)
Pterocles bicinctus bicinctus Temminck. Not common, moves about at dusk.
82. ROCK PIGEON (V396, R311/B)
Columba guinea bradfieldi (Roberts). Not common, occurring along coastal cliffs.
83. TURTLE DOVE (V403, R316/C)
Streptopelia capicola damarensis (Finsch & Hartlaub). Plentiful, breeding in trees at Alexander township.
84. LAUGHING DOVE (V–, R–)
Streptopelia senegalensis aequatorialis Erlanger. Common in gardens at the township.
85. NAMAQUA DOVE (V405, R318)
Oena capensis capensis (Linnaeus). Plentiful.
86. DIDRIC CUCKOO (V426, R352)
Chrysococcyx caprius (Boddaert). Alexander Bay. (List Winterbottom, Courtenay-Latimer).
87. BARN OWL (V501, R359)
Tyto alba affinis (Blyth). Common.
88. SPOTTED EAGLE OWL (V514, R368)
Bubo africanus africanus (Temminck). Observed along river.
89. RUFOUS-CHEEKED NIGHTJAR (V522, R372)
Caprimulgus rufigena rufigena Smith. Common.
90. FRECKLED NIGHTJAR (V523, R374)
Caprimulgus tristigma lentiginosus (A. Smith) Not common. (List Winterbottom/ Courtenay-Latimer).
91. WHITE-BACKED MOUSEBIRD (V532, R–)
Colius colius damarensis Reichenow. Very plentiful.
92. TRANSVAAL RED-FACED MOUSEBIRD (V534, R392/B)
Urocolius indicus transvaalensis (Roberts). Common.
93. WHITE-RUMPED SWIFT (V585, R383)
Apus caffer caffer (Lichtenstein). Common.
94. ALPINE SWIFT (V580, R386)
Apus melba africanus (Temminck). Common.
95. PIED KINGFISHER (V462, R394)
Ceryle rudis rudis (Linnaeus). Not plentiful, one only observed near Orange River mouth.
96. GIANT KINGFISHER (V463, R395)
Megaceryle maxima maxima (Pallas). Observed one bird along Orange River, not common.
97. MALACHITE KINGFISHER (V465, R397)
Alcedo cristata cristata (Pallas). Quite plentiful, observed along Orange River.
98. EUROPEAN BEE-EATER (V473, R404)
Merops apiaster Linnaeus. Migrant. (List Winterbottom/Courtenay-Latimer).
99. SWALLOW-TAILED BEE-EATER (V480, R411)
Merops hirundineus hirundineus Lichtenstein. Common, breeds along Orange River.

100. AFRICAN HOOPOE (V494, R418)
Upupa africana Bechstein. Grootderm. (List Winterbottom/Courtenay-Latimer).
101. SCIMITAR-BILL HOOPOE (V499, R421)
Rhinopomastus cyanomelas cyanomelas (Vieillot). Common along Orange River.
102. PIED BARBET (V450, R432/B)
Lybius leucomelas namaqua (Sclater). Common along Orange River.
103. CARDINAL WOODPECKER (V567, R450)
Dendropicos fuscescens fuscescens (Vieillot). Fairly plentiful along Orange River vegetation and in gardens of settlement.
104. KARROO LARK (V–, R461/F)
Certhilauda albescens cavei Macdonald. We found this red-backed lark to be very plentiful. They interbred in this area with the dark heavily-streaked *C. a. guttata* and *C. a. codea*. Nests and eggs August 1960.
105. KARROO LARK (V622, R461/C)
Certhilauda albescens guttata (Lafresnaye). Plentiful; these larks found interbreeding with *C. a. cavei*.
106. THICK-BILLED LARK (V630, R463)
Calendula magnirostris ? *magnirostris* (Stephens). Common — ? race.
107. CLAPPER LARK (V600, R466)
Mirafra apiata ? *apiata* (Vieillot). Holgat River. ? race. (List Winterbottom/Courtenay-Latimer).
108. SPIKE-HEELED LARK (V648, R474/C)
Certhilauda albofasciata garrula (A. Smith). Not common, observed in isolated parties only.
109. LONG-BILLED LARK (V–, R475/C)
Certhilauda curvirostris falcirostris Reichenow. Common, an extremely wild and restless bird. Young birds on the wing.
110. GREY-BACKED FINCH-LARK (V666, R485/B)
Eremopterix verticalis damarensis Roberts. Not common, observed at Alexander Settlement at water.
111. BLACK-EARED FINCH-LARK (V667, R486)
Eremopterix australis (A. Smith). Not common, observed feeding alongside of road.
112. RED-CAPPED LARK (V–, R488/D)
Tephrocorys cinerea witputzi Macdonald. Plentiful on lucerne lands at Alexander Settlement.
113. STARK'S LARK (V675, R492)
Calandrella starki ? Race. Alexander Bay. (List Winterbottom Courtenay-Latimer).
114. WHITE-THROATED SWALLOW (V991, R495)
Hirundo albigularis albigularis Strickland. Observed at Alexander Settlement, not plentiful.
115. LARGER STRIPED SWALLOW (V998, R502)
Hirundo cucullata (Boddaert). Uninhabited nests only observed under cliffs and at houses.
116. S.A. SAND MARTIN (V1004, R509)
Riparia paludicola paludicola (Vieillot). This bird is common outside the area under review, but it has been recorded from Grootderm. (List Winterbottom/Courtenay-Latimer.)
117. ROCK MARTIN (V1007, R506/B)
Hirundo fuligula anderssoni (Sharpe & Wyatt). Common, sheltering along cliffs of Holgat River.

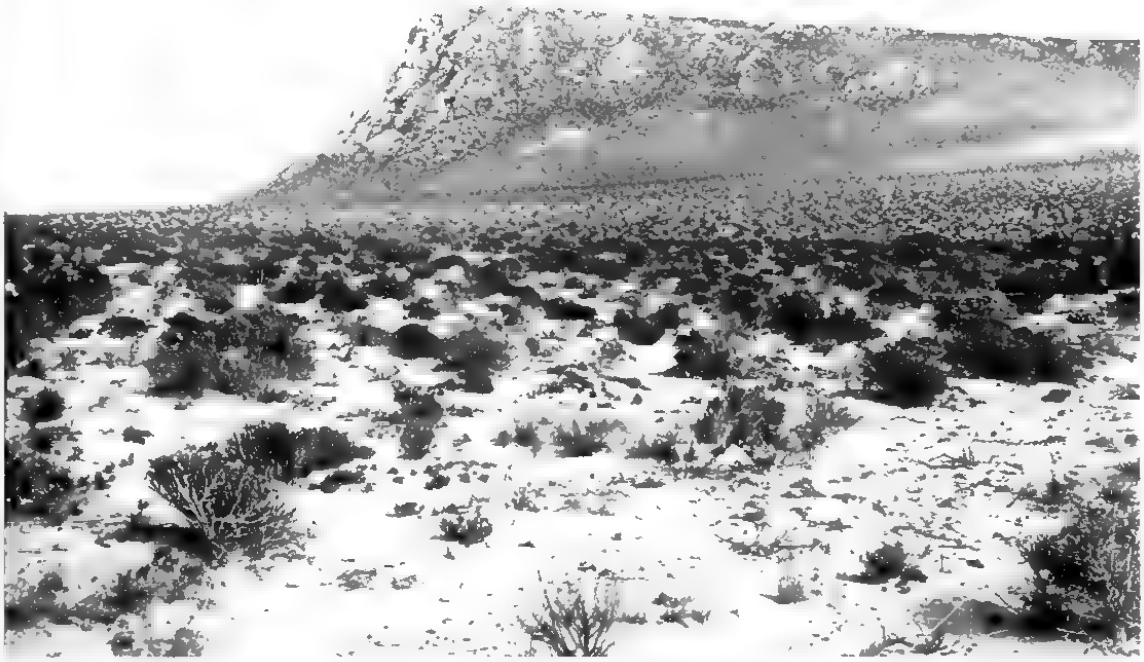
118. GREY TIT (V1064, R525/B)
Parus afer cinerascens Vieillot. Common, occurs in tall vegetation along the Orange River.
119. PENDULINE TIT (V1070, R531)
Anthoscopus minutus minutus (Shaw and Nodder). Common, occurring in small parties in dense scrub.
120. WHITE-NECKED RAVEN (V1082, R524)
Corvultur albicollis (Latham). Not observed during visits, but recorded Grootderm. (List Winterbottom/Courtenay-Latimer).
121. CAPE BULBUL (V727, R543)
Pycnonotus capensis (Linnaeus). (List Winterbottom/Courtenay-Latimer).
122. RED-EYED BULBUL (V728, R544)
Pycnonotus nigricans nigricans (Vieillot). Very common in the settlement and along Orange River vegetation.
123. NAMAQUA THRUSH (V797, R553/E)
Turdus olivaceus smithi Bonaparte. Common, observed at settlement and along Orange River.
124. SHORT-TOED THRUSH (V801, R561)
Monticola brevipes brevipes (Waterhouse). Not common, observed along coastal rocky outcrops, extremely wild.
125. CAPPED WHEATEAR (V808, R568)
Oenanthe pileata pileata (Gmelin). Not common, observed on open flats.
126. MOUNTAIN CHAT (V805, R564)
Oenanthe monticola monticola Vieillot. Not common, observed on rocky outcrop on hillside.
127. GREY-RUMPED SICKLE-WING CHAT (V818, R566)
Cercomela schlegelii schlegelii (Wahlberg). Fairly plentiful on open flats, breeding.
128. FAMILIAR CHAT (V813, R570/D)
Cercomela familiaris galtoni (Strickland). Fairly plentiful, breeding.
129. LAYARD'S CHAT (V814, R571)
Cercomela tractrac tractrac (Wilkes). Breeding, common.
130. ANT-EATING CHAT (V826, R575)
Myrmecocichla formicivora formicivora (Vieillot). Not common, observed on open flats. Race uncertain, possibly *M. f. minor.*
131. STONECHAT (V–, R)
Saxicola torquata clanceyi Courtenay-Latimer. Fairly common, usually in pairs, breeding.
132. CAPE ROBIN (V837, R581/B)
Cossypha caffra namaquensis W. Sclater. Common in thick cover along the river and in the settlement gardens.
133. KARROO SCRUB ROBIN (V–, R583/B)
Erythropygia coryphaeus cinereus Macdonald. Breeding, fairly plentiful.
134. YELLOW-BELLIED BUSH WARBLER (V922, R600)
Eremomela icteropygialis icteropygialis (Lafresnaye). Fairly plentiful in dry scrub.
135. AFRICAN MARSH WARBLER (V–, R–)
Acrocephalus baeticatus hallae White. Common along Orange River and in reeds and scrub surrounding vleis at the settlement.
136. RUFOUS-EARED WARBLER (V977, R619)
Prinia pectoralis pectoralis (Smith). Not very common, observed and collected at Holgat.

137. CROMBEC (V919, R621)
Sylvietta rufescens rufescens (Vieillot). Common, the clear metallic call being heard everywhere.
138. KARROO GREEN WARBLER (V929, R626/B)
Eremomela gregalis gregalis Wahlberg. Very common, but rather elusive in scrub.
139. COMMON FANTAIL CISTICOLA (V936, R629)
Cisticola juncidis terrestris (Smith). Common along edge of lucerne fields.
140. GREY-BACKED CISTICOLA (V944, R638/B)
Cisticola subruficapilla namaqua Lynes. Fairly plentiful in thick undergrowth along river.
141. BLACK-CHESTED PRINIA (V984, R650)
Prinia flavicans flavicans (Vieillot). Fairly common along river and the settlement in thick undergrowth.
142. WHITE-BREASTED PRINIA (V987, R653)
Prinia substriata (Smith). Common in the thickets along Orange River and at the settlement.
143. TIT-BABBLER (V750, R658)
Parisoma subcaeruleum subcaeruleum (Vieillot). Fairly common, the warbling song heard throughout the area.
144. LAYARD'S TIT-BABBLER (V–, R–)
Parisoma layardi aridicola Winterbottom. Very common, the song most charming in this hot arid area. Young on the wing 18/8/1960.
145. CHAT FLYCATCHER (V760, R663)
Bradornis infuscatus infuscatus (A. Smith). Not very abundant.
146. BRUBRU SHRIKE (V770, R731)
Nilaus afer brubru (Latham). Along Orange River in riparian thickets only, not common.
147. PRIRIT FLYCATCHER (V776, R674)
Batis pririt affinis (Wahlberg). Common, occurs along river vegetation and in gardens at the settlement.
148. FAIRY FLYCATCHER (V780, R678)
Stenostira scita scita (Vieillot). Not common, seen flitting about in scrub.
149. PIED WAGTAIL (V679, R685)
Motacilla aguimp aguimp Dumont. Common along Orange River.
150. CAPE WAGTAIL (V682, R686)
Motacilla capensis capensis Linnaeus. Common in the settlement.
151. TAWNY PIPIT (V692, R692)
Anthus novaeseelandiae rufuloides Roberts. Not common. (List Winterbottom/ Courtenay-Latimer).
152. NICHOLSON'S PIPIT (V698, R693/B)
Anthus similis leucocraspedon Reichenow. Not common.
153. FISCAL SHRIKE (V1023, R707/B)
Lanius collaris subcoronatus A. Smith. Not common, inhabits settlement and in Orange River vegetation.
154. BOKMAKIERIE (V–, R–)
Telophorus zeylonus thermophilus Clancey. Fairly plentiful, breeding, extremely wild.
155. PALE-WINGED STARLING (V1097, R744)
Onychognathus nabouroup nabouroup (Daudin). Fairly plentiful, especially at Holgat.

156. PIED STARLING (V1100, R746)
Spreo bicolor (Gmelin). Possibly a rare migrant to this area. (List Winterbottom/Courtenay-Latimer).
157. MALACHITE SUNBIRD (V1114, R751)
Nectarinia famosa famosa (Linnaeus). Common along Orange River.
158. LESSER DOUBLE-COLLARED SUNBIRD (V1125, R760)
Cinnyris chalybeus chalybeus (Linnaeus). Fairly common in dense scrub.
159. DUSKY SUNBIRD (V1129, R764)
Cinnyris fuscus Vieillot. Very common, breeding. Easily the commonest of the small birds in this area.
160. CAPE WHITE-EYE (V1108, R775/D)
Zosterops pallidus pallidus Swainson. Exceedingly common, literally filling the trees in flocks.
161. MOSSIE (V1253, R786/B)
Passer melanurus damarensis Reichenow. Common in the settlement, doing much damage in gardens.
162. MASKED WEAVER (V1160, R803)
Ploceus velatus velatus Vieillot. Plentiful during breeding season, only immature birds observed and collected.
163. RED BISHOP BIRD (V–, R–)
Euplectes orix turgidus Clancey. Plentiful during breeding season. Only immature birds were observed and collected during our visits.
164. COMMON WAXBILL (V1232, R843 B)
Estrilda astrild damarensis Reichenow. Plentiful, moving about in large parties along Orange River and in thickets near the settlement.
165. PIN-TAILED WHYDAH (V1245, R846)
Vidua macroura (Pallas). Not common, observed along Orange River and at settlement.
166. BLACK-THROATED CANARY (V1282, R860/E)
Serinus atrogularis deserti (Reichenow). Not common.
167. BLACKHEAD CANARY (V1275, R861/B)
Alario alario leucolaema Sharpe. Fairly plentiful in open scrub.
168. WHITE-THROATED SEED-EATER (V1289, R865/D)
Serinus albigularis sordahlae Friedmann. Fairly plentiful.
169. YELLOW CANARY (V1261, R866)
Serinus flaviventris flaviventris (Swainson). Common in open scrub and water points.
170. LARK-LIKE BUNTING (V1305, R871)
Fringillaria impetuani impetuani (A. Smith). Common especially at water points.
171. CAPE BUNTING (V -, R873/D)
Fringillaria capensis karasensis Roberts. Common at Holgat and along rocky coast.
172. GOLDEN-BREASTED BUNTING (V–, R–)
Emberiza flaventris princeps Clancey & Winterbottom. Not common, and very evasive. This race is easily recognised by the white over the sides of the body.

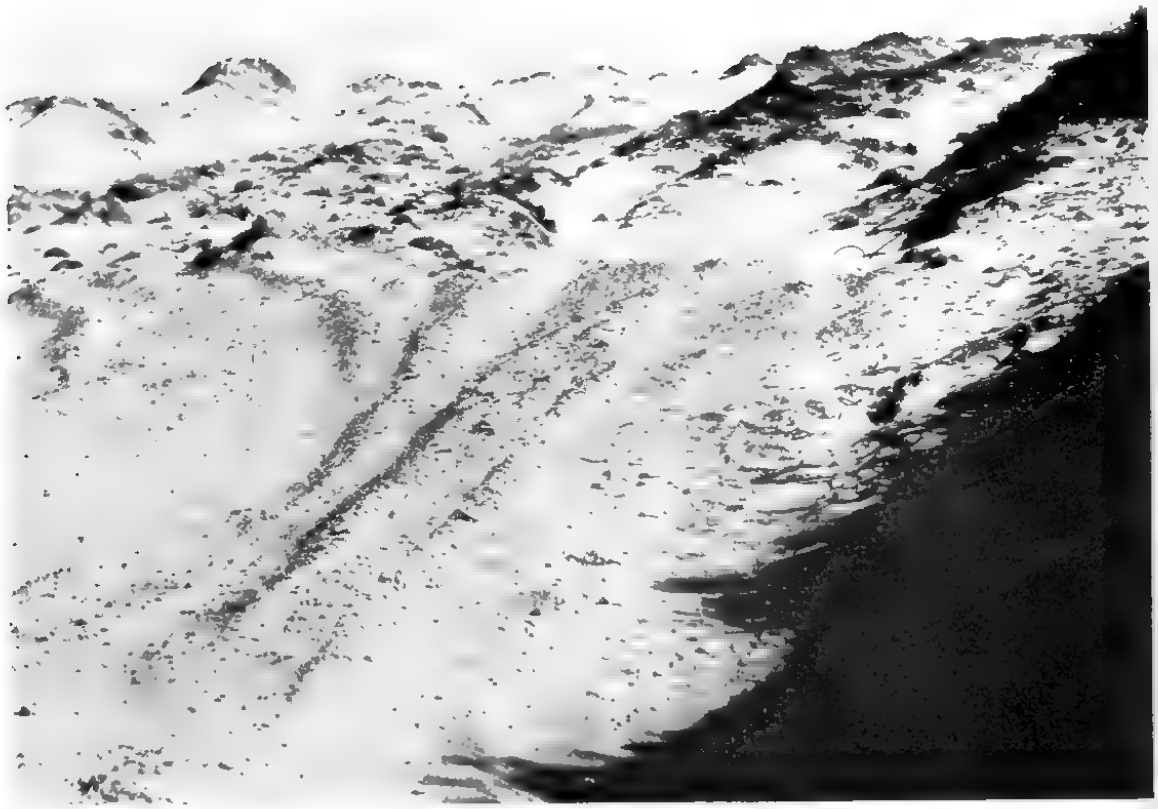
(*Photo:* Mrs. D. B. Smit)
Mud flats looking towards Orange River Mouth where birds congregate.

Swamps behind Township Alexander Bay. (*Photo:* Mrs. D. B. Smit)

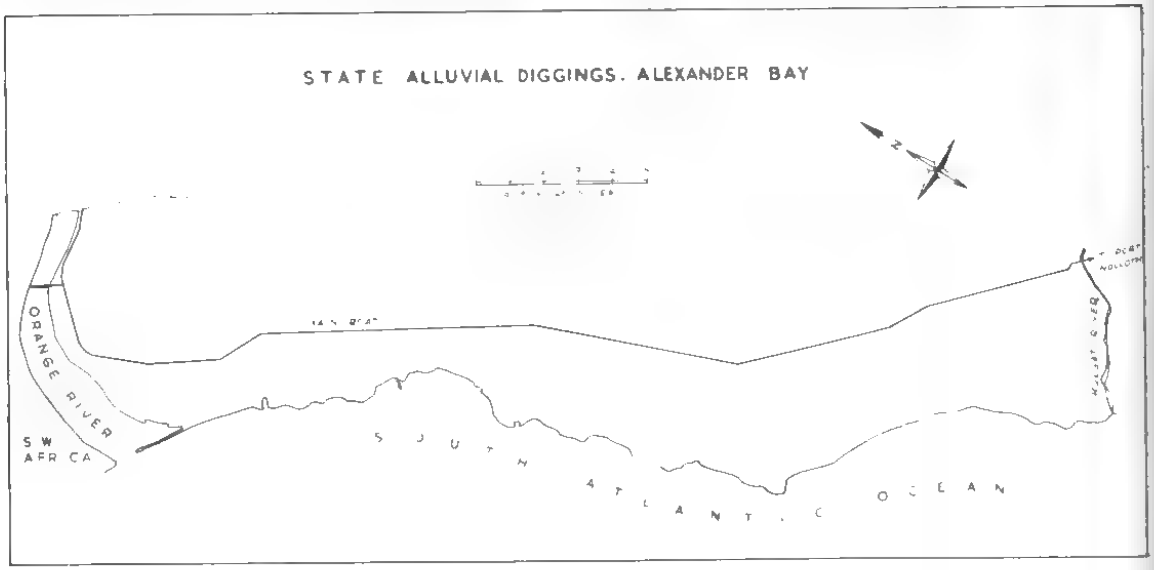


Sparsely covered flats and Hill in Reserve. (*Photo:* Mrs. D. B. Smit)

Open Flats. Alexander Bay. (*Photo:* Mrs. D. B. Smit)



Habitat of the Long-billed Lark.



Plan showing Restricted Area in which Check List was compiled.

R. LIVERSIDGE AND
MISS M. COURTENAY-LATIMER

PORT ELIZABETH AND
EAST LONDON MUSEUMS.

Sabine's Gull in South Africa

(*Accepted 30th April, 1963*)

Three records for the Sabine's Gull *Xema sabini* (Sabine) from our coast have been published. The first a sight record at Cape Town (Morgan & Wheeler 1958) later a specimen from Slang Bay in the Eastern Cape (Liversidge 1958) and thirdly a sight record of four off the Cape Peninsula (Edwards 1961). Since these published records a number of specimens have been collected by the East London Museum and several sight records have come to light, which indicate that the species is a summer visitor occurring more regularly than had hitherto been suspected. For this reason and because our sea bird populations appear to have changed considerably since last century, the full details are recorded below.

The first known record of the Sabine's Gull was of a flock of five birds on Bird Island (33 51'S, 26 15'E) seen on November 29th 1936 by Miss M. Courtenay-Latimer and her father. Subsequently on 20th March 1941 Miss M. Courtenay-Latimer recorded three birds at sea en route to Bird Island from Port Elizabeth. In field notes made on both occasions the black bill with yellow tip was noted and the forked tail seen in flight on the second observation put the field identification beyond doubt. Sketches were also made at the time and comparison was made with the Kittiwake *Rissa tridactyla*.

The second record was by Mr. A. Thomas an officer on board the research vessel R.S. *Africana II*; he sketched a bird on 2nd February 1953 at research station R (33 05'S, 17 47'E) off St. Helena Bay in the Western Cape. The sketch shows the diagnostic features of forked tail with black terminal bar; distinctive wing patterns, nape markings and yellow tip to bill. At the time the bird was unidentified and subsequently overlooked. In working through these records made at sea between the period November 1950 to June 1953 this is the only observation of the species in what may be termed the most comprehensive regular study of the sea birds off our coast.

The third record was a sight observation by R. Liversidge on the 20th January 1954 en route from Cape Town to Dassen Island. "Many birds" were recorded and memory, though vague is of at least 20 birds. This recollection is substantiated by the fact that a visiting ornithologist made disparaging remarks about the lack of knowledge of "such a common bird". Detailed notes of yellow tip to bill, forked tail and wing pattern made at the time and a sketch leave no doubt as to the birds' identity. The identity of these birds as the rare high-arctic Sabine's Gull without a substantiating specimen was considered too fantastic.

The first specimen was collected at Slang Bay, Eastern Cape on 26th February, 1958

by Capt. G. M. le Gras. The second specimens a ♂ and ♀ off Port Alfred 6th February 1959 and later an immature ♀ bird, 10 miles south of Bird Island (33° 51′ S, 26° 15′ E) on 7th December 1960. These were collected by Capt. M. P. Goosen from trawlers and presented to the East London Museum. All specimens are in worn condition.

A common factor from these records is that all are during the summer months, namely November to March. This becomes important in view of the known "Wintering" grounds of this species according to Fisher and Lockley 1954. The species breeds in the Arctic circle and apparently winters on the Pacific coast of the Americas and in the Atlantic. Fisher and Lockley state the main wintering place of the Pacific population appears to be off the coast of Peru. The Atlantic birds are recorded from the Bay of Biscay but Fisher and Lockley state that "whether this is the main wintering place, remains to be proved". Dr. R. C. Murphy in earlier correspondence believed the Atlantic records to be casual; this opinion is no doubt influenced by the paucity of records of this rare gull.

The west coast of Africa is stated to be one of the wintering areas by the check list of the American Ornithologists' Union (1957). With the increase in numbers of observation it appears that the southern and south-western African coast must form the end of the migration route. It is possible that this species has been drawn south by the arctic tern (*Sterna macrura* Naumann-*Sterna paradisaea* of the A. O. U. Check List.). The specimens in 1958, 1959 and 1960 were recorded the month following peak numbers of common and arctic terns *S. macrura S. hirundo* counted at sea. It is not known whether there are changes which are causing the gull to extend its migration. There are no early records but because of the rarity of the species this is no criterion that they have never migrated as far south as Cape waters.

Habits

The Sabine's Gull is more of a pelagic bird than our own coastal species of gull. It is apparently attracted by trawling activities. Very similar to the Hartlaub's gull *Larus hartlaubi* and like it, appears slightly shorter winged in flight than the Grey-headed Gull *Larus cirrocephalus*.

Miss M. Courtenay-Latimer and Morgan and Wheeler (1958) observed the flight was rather tern-like and the general appearance plumper and more rounded than Hartlaub's Gull. The latter saw the bird swimming and flying and it associated with terns rather than the Hartlaub's Gull. The first author observed numbers mixed with numbers of Hartlaub's Gulls only; though there were many adult Sabine's Gulls no juvenile birds were seen in this flock.

All specimens collected and observed have been in winter plumage. In the field this bird is easily distinguished from any other species of gull known from our area by its distinctive wing pattern, forked tail, and by the yellow tip to the bill of an adult. The Juvenile whilst lacking the light tip to bill in younger birds, has a distinct blackish terminal bar to the tail—see sketch.

Taxonomic Note

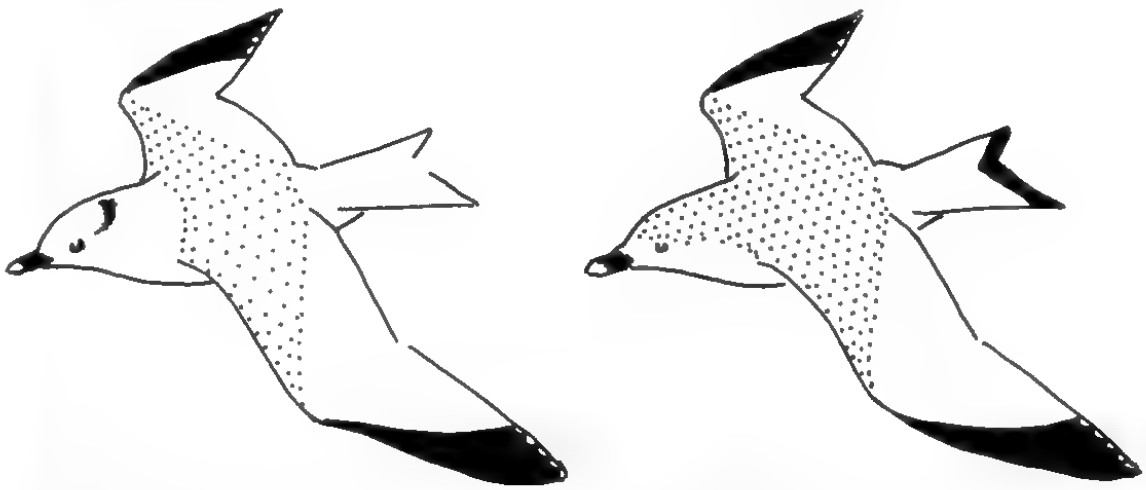
Four races of Sabine's Gull have been described. These are, following Portenko (1939):

X. s. sabini (Sabine). From Greenland.
X. s. palaearctica Stegmann. From Siberia approx. 98° to 126° E.
X. s. tschuktschorum Portenko. From Western Siberia 180° E.
X. s. woznesenskii Portenko. From West Alaska.

Witherby (1941) considers the difference between *sabini* and *woznesenskii* in a good series to be very slight and not constant. The race was named from only two specimens. This race, however, is recognised by the American Ornithologists Union (1957) who consider *palaearctica* and *tschuktschorum* synomymous with *sabini* though they admit birds adjacent to the Bering Strait are somewhat intermediate. Without the material at hand the

considered opinion (and most recent available) of the committee of the A.O.U. is accepted. *X. s. sabini* is lighter coloured and slightly smaller than *X. s. woznesenskii*. The nominate race is recorded from Atlantic waters and many countries in western Europe and eastern north America.

The first specimen collected in South Africa was identified by Dr. C. R. Murphy who stated the plumage was too worn to be able to recognise the race. All our specimens have worn plumage. The measurements, given below, fall into the smaller *sabini* series. The race can therefore be stated to be *Xema sabini sabini* (Sabine) Tran. Linn. Soc. London, 12, pt. 2, 1819, p. 522.



A sketch showing the adult and immature Sabine's Gull. Note the difference in the head and tail markings. The immature may have the tip of bill dusky rather than yellow.

Description

The sketch shows the pattern. In the adult the bird is white with pale slate-grey upper parts and the primaries for the most part black. Brown-black on nape. The iris is dark brown, bill black with a yellow tip. The legs and feet are dusky grey to flesh with lighter-yellower webs.

The juvenile has grey-brown upper parts which extend onto crown, from the mantle and upper parts which are also grey-brown. The tail has a broad (3 cm.) brown-black terminal band with slightly narrower sides. The soft parts show darker feet and the tip of the bill is dusky not yellow.

The single juvenile specimen (7.12.60) shows moult started from grey-brown to slate-grey on mantle. Also the horn-yellow of bill is just appearing at the basal end of the yellow zone of the adult. One of the adult specimens shows moult of the secondaries.

In the breeding condition the whole head is dark lead-grey; moult normally takes place April to May.

Measurements of specimens collected; mm.

	♂	♂	♀	*Juv*♀
Wing	268	263	260	245
Tail	98–117	88–111	84–112	78–102
Tarsus	32·9	34·5	31·4	32·2
Bill	28·1	28·1	26·1	27·2
Yellow tip of bill ..	11–13·3	11·2–14·7	8·5–10	—

Summary

Records totalling four specimens and five reliable field observations are detailed. The wintering grounds are extended to southern Africa. The racial status is that of the nominate bird. A description and measurements based on the specimens are given.

Acknowledgements

We wish to record our thanks and appreciation to Capts. H. P. Goosen and M. le Gras who collected the specimens and made observations of the sea birds. We thank Dr. C. R. Murphy and Dr. F. Salomonsen for identifying the first and second specimens and Mr. A. Thomas for permission to include his observation.

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PIETERMARITZBURG.

Two Specimens of the Beaked Whale—*Mesoplodon densirostris* (Blainville) washed ashore near Port Elizabeth, South Africa

(*Accepted 4th September, 1961*)

The first specimen of the Beaked Whale—*Mesoplodon densirostris*—was washed ashore at Shelly Beach near Cape Recife and was reported by the Lighthouse Keeper, Mr. Auret, on 27th April, 1952. This specimen was a male and the following measurements were recorded:—

Total length: 15′ 6″
Width across the flukes: 3′ 4″
Tip of tail to vent: 4′ 7″
Vent to genital opening: 17½″
Anterior end to the base of the pectoral fin: 3′ 6″
Anterior end to the eye: 2′ 3″
The genital opening was located below the dorsal fin.

The entire skeleton was rendered down and preserved. A full size reconstruction of the Whale was made and mounted in the Port Elizabeth Museum.

The second specimen was washed ashore near Jeffreys Bay –about 50 miles from the point where the previous one was stranded. It was discovered by a farmer who loaded it on a roughly constructed sleigh and dragged it several miles inland to his homestead. All the blubber was removed and the carcass was buried. It was first reported to me early in January 1953 which was about a month after the specimen was washed ashore. The carcass was so badly mutilated and decayed that no measurements could be taken and only the skull was preserved.

Attached to the tip of each tooth of the female was a mass of seaweed, about 6″ to 10″ in length. There was no seaweed attached to the teeth of the male.

The right ramus of the male had broken about midway between the tooth and the posterior end. This was an old fracture which had not fused completely but had formed a false joint.

In the case of the male a diligent search was made in the region where we would expect to find the pelvic bones but no trace of these bones was located.

In a specimen of *Mesoplodon europaeus* from the West Indies, Rankin (1953) was unable to locate any pelvic bones but noted a broad band of tough fibrous tissue in that region. It might well be possible that the pelvic bones of these two species of Mesoplodon have disappeared completely.

(*Photo:* "Eastern Province Herald")
Mesoplodon densirostris washed ashore at Cape Recife.

Measurements (in millimetres) of the two skulls of—
Mesoplodon densirostris

	Male	*Female*
Total length of skull	756	704
Height of vertex to inferior border of pterygoids	320	303
Width at centre of orbits	357	323
Width of foramen magnum	98	95
Rostrum, length from level of bases of antorbital notches	460	397
Rostrum, width between bases of antorbital notches	195	192
Rostrum, width at midlength	68	60
Rostrum, depth at midlength	92	83
Rostrum, least width proximal to midlength	64	56
Rostral depth at same point	98	88
Breadth of expanded proximal ends of premaxillae	145	131
Least breadth of premaxillae opposite anterior nares	109	91
Breadth of anterior nares	46	44
Least distance between the post dorsal margins of the maxillary foramina	84	70
Posterior border of left maxillary foramen to anterior extremity of left maxillary protuberance	69	60

	Male		*Female*
	right	*left*	*left*
Length of tooth	138	130	—
Width of tooth (anteroposterior)	92	96	68
Width of tooth (transverse)	49	46	29

According to Moore (1958) the two whales recorded in this paper represent the 13th and 14th known specimens of this species.

No further specimens have so far been recorded from the South Atlantic but there are two records from the Indian Ocean:

(1) A skull from the Seychelles in the Paris Museum.

(2) A rostrum from Algoa Bay in the Museum of the Royal College of Surgeons, England. (Private communication J. C. Moore).

I wish to record my thanks to Dr. G. R. McLachlan, Director of the Port Elizabeth Museum, for the loan of the two skulls.

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R. C. BIGALKE

ALEXANDER McGREGOR
MEMORIAL MUSEUM, KIMBERLEY.

A Note on Reproduction in the Steenbok *Raphicerus campestris* Thunberg

(*Accepted 1st June, 1963*)

Introduction

The only original published information on the gestation period of the Steenbok, *Raphicerus campestris*, known to the author is the statement by Wilhelm (1933) that "Die Tragzeit beträgt ebenfalls 7 Monate". Shortridge (1934) and Kenneth (1953) both quote this source when stating that the gestation period is 7 months (210 days). Wilhelm gives no indication of the means whereby he established the length of gestation and the author has long suspected that he did little more than guess. Considering the small size of the animal, which seldom attains a weight much in excess of 30 lb. (Shortridge, *op.cit.*), and since a much larger antelope like the Springbok, *Antidorcas marsupialis*, (females at Kimberley average 58 lb., Bigalke unpubl.) has a gestation period of about 171 days (Kenneth, *op.cit.*), it seems most unlikely that the steenbok would in fact take as long as 7 months to produce young.

Evidence in support of this view has come from an unexpected source. A Kimberley resident, Capt. C. G. J. Kruger, has kept a pair of steenbok as pets for several years. The female recently produced her sixth lamb and when the author was notified of this he found that Mrs. Kruger had kept a record of the birth dates of all the offspring. She kindly made the information available and it is summarised in Table I.

Table I

LAMBS BORN TO CAPTIVE STEENBOK

Lamb No.	*Sex*	*Date of birth*	*Days since previous birth*
1	♂	15 Sept. 1960	—
2	♂	2 March 1961	168
3	♂	26 Aug. 1961	177
4	♂	15 Feb. 1962	173
5	♂	12 Nov. 1962	270
6	♂	3 May 1963	172

Gestation Period

In four cases a lamb was produced 168 177 days after the previous parturition and the interval between births was greater in only one case, viz. lamb No. 5, born 270 days after

lamb No. 4. Disregarding this exception for a moment, it is clear that if two successive births can take place within 168 days the gestation period can be as short as this if mating is assumed to take place shortly after parturition. And since four out of five intervals between births are 177 days or less, the normal gestation period cannot exceed 177 days at the most.

If we wish to use the number of days between successive births as an indication of the length of the gestation period, the unusually long interval of 270 days between lambs No. 4 and 5 calls for an explanation. One might guess that the female usually comes into oestrus immediately after parturition but that on this occasion, for some unknown reason, she did not do so. What might be called the spring lamb was born to our female in mid-September 1960 and in late August 1961, but only in mid-November 1962.

It is probably no coincidence that a similar phenomenon was observed amongst springbok on farms near Kimberley (Bigalke, unpubl.). Observations made on several farms each year since 1958 have shown that the great majority of springbok lambs are born in a peak period of about two weeks. The timing of this peak varies a little from year to year but is usually in late August or the first half of September. In 1962 the peak was conspicuously late and the first lambs were only seen in mid-November.

One may make a tentative suggestion that some environmental factor, or complex of factors, which influences the timing of sexual activity in antelopes, acted in an unusual manner in 1962. Both the particular steenbok under discussion and the springbok observed on Kimberley farms were influenced in the same way and produced young markedly later in the year than usual. For the moment this must remain pure speculation, pending further analysis of meteorological data, etc.. In any event it provides some basis for the assumption that the period of 270 days which elapsed between the birth of the two steenbok lambs in 1962 was abnormally long. Accordingly it can be claimed that the data presented in Table I provide good evidence that the gestation period of the steenbok ranges from 168 days or less to 177 days or less.

Postparturient Heat

This raises the question of whether the steenbok experiences postparturient heat. Asdell (1946) states that it occurs frequently in the *Cricetidae*, the *Muridae* and in seals. In the Bactrian Camel he reports that the foal heat is experienced the day after calving, more rarely after 2 to 3 days. The Nilgai (*Boselaphus tragocamelus*) is reported to breed immediately after dropping its calves (Brander, quoted in Asdell, *op.cit.*). Wilhelm (*op.cit.*) thought it likely that steenbok mated shortly after birth of the lamb and the evidence from the animals which form the subject of this paper supports his suggestion. Capt. Kruger informed me, spontaneously and without being questioned on the point, that the male of his pair began to take an active sexual interest in the female shortly after the birth of lamb No. 6 on May 3rd, 1963. On May 4th he was seen to be chasing her vigorously. The regular production of two lambs a year by this female makes it necessary to assume, either that oestrus occurs again very shortly after parturition or that it sets in later in which case the gestation period would be shorter than suggested above. It seems very likely that postparturient heat does in fact usually occur. That the Kimberley female is probably not abnormal in bearing two lambs a year is suggested by Stevenson-Hamilton's statement (quoted in Shortridge, *op.cit.*) made on the basis of field observations, that "it seems likely that the females often produce two young ones in the course of a year".

Seasonal Breeding

Not much is known about the time of year at which young are born in nature. Wilhelm (*op.cit.*) states "Kitze findet man etwa im Mai und Dezember". Stevenson-Hamilton (in Shortridge, *op.cit.*) is quoted as saying "Steenbok breed during the South African summer

and well into the autumn" and in S.W. Africa Shortridge found foetuses and newly born calves in the months of April, May, September, November and December. In Northern Rhodesia Ansell (1960a) records a well-developed foetus in March and a juvenile under one month old in September.

Dasmann and Mossman (1962), working in Southern Rhodesia, observed young estimated under one month old in February, March, May, June, July, August, November and December. Pregnant females were collected in August and November. They believe that year-long breeding is probable but think it likely that a peak in lambing is reached early in the dry season, i.e. at the time which I call "autumn".

The data in Table I show that the "autumn" lambs were born on March 2nd, 1961, February 15th, 1962 and May 3rd, 1963. As noted above the "spring" lambs were born on September 15th, 1960, August 26th, 1961 and November 12th, 1962. There is thus a tendency to produce young at the end of the dry season or the beginning of the wet season and again at the end of the wet season or early in the dry season, i.e. there seem to be two seasonal breeding peaks. Ansell (1960b) has pointed out that seasonal breeders among the Bovids are usually gregarious while solitary or semi-gregarious species are believed to have their young at any time. The steenbok is found singly or in pairs and strictly seasonal breeding is therefore not to be expected. However Ansell's field data were collected in Northern Rhodesia (about 10°–15° S. latitude) whereas Kimberley lies much further South (almost 29° S. latitude) and has considerably greater seasonal fluctuations of temperature, light intensity, etc., factors which might be expected to play a part in regulating breeding seasons. It may be significant that the observations by Dasmann and Mossman (*op. cit.*) which led them to suggest that the steenbok has a lambing peak early in the dry season, were made in Southern Rhodesia at a latitute of 21° S.

The necessity for field observations to establish whether or not the steenbok does have two seasonal breeding peaks in South Africa, is obvious. More information about the animal's breeding habits in the tropical parts of its area of distribution might help us to understand how reproduction is controlled in a species which ranges from equatorial regions to areas far outside the tropics.

Reproductive Potential

Dasmann and Mossman (*op. cit.*) believe that steenbok produce their first young at one year of age. The animal with which this paper is concerned is thought by her owners to have been about one year old when she bore her first lamb in 1960. It thus seems likely that females usually reach sexual maturity when only six or seven months old.

The captive ewe is kept under optimal conditions with ample food and shelter. One may therefore expect her reproductive performance to be the best of which the species is capable. Under field conditions unfavourable weather or a shortage of food may well depress reproductions so that the maximum of two young per annum may not always be attained. In any case for an understanding of the population dynamics of the species it is interesting to know that one pair can produce two young per year.

Summary

Data on reproduction in a captive steenbok, *Raphicerus campestris*, is presented. Between September, 1960 and May, 1963 the animal bore six lambs. The shortest period between two successive births was 168 days and the longest 270 days but four out of five intervals were 177 days or less. A possible explanation of the 270 day period is suggested and the gestation period is presumed to be between 168 days or less and 177 days or less. There is good evidence for the occurrence of postparturient heat and of two seasonal breeding

peaks, one at the end of the dry season or the beginning of the wet season and one at the end of the wet season or early in the dry season. Field observations are needed to confirm whether such peaks are of general occurrence in this species. Steenbok appear to lamb for the first time when one year old and under optimal conditions they produce two young per year.

Acknowledgements

I am most grateful to Capt. and Mrs. C. G. J. Kruger for so kindly giving me the information about their pets on which this paper is based. Mr. O. A. Leistner was good enough to read the manuscript critically.

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PORT ELIZABETH.

A record of the Speckled Dolphin from the South-East Coast of South Africa

(*Accepted 1st July, 1963*)

Delphinus (*Steno*) *lentiginosus* Owen, Trans. Zool. Soc. London 1866.
Sotalia lentiginosus Flower, Proc. Zool. Soc. London 1883.
Sotalia lentiginosa True, Bull. U.S. Nat. Mus. 1889.
Steno lentiginosus Blanford, Mammals of India 1891.
Sotalia lentiginosa Sclater, Fauna of South Africa 1901. Roberts, Mammals of South Africa 1951. Barnard, Guide Book to South African Whales and Dolphins 1954.

Among the dolphins found in the coastal waters of Southern Africa least is known of the habits or even of the occurrence of the Spotted or Speckled Dolphin, *Sotalia lentiginosa* (Owen). This species has previously been recorded from river estuaries along the coast of India; the type specimen in the British Museum of Natural History having been obtained from Visagapatam. Taking climatic and other factors into account, there is no apparent reason why these dolphins should not occur further south in our waters.

Allen (1939) makes no mention of *Sotalia lentiginosa* in his Checklist of South African Mammals but subsequently Roberts (1951) and Barnard (1954) have recorded it in their respective works on the mammals of South Africa and South African whales and dolphins as a doubtful South African species. This species has been included in their lists of Cetacea found in our waters on the strength of a skull picked up on the beach at Muizenberg, although there was no evidence to show that the whole animal had been washed up there. This skull was presented to the South African Museum at Cape Town in 1896 and Sclater (1901) provisionally assigned it to the species *Sotalia lentiginosa*, saying at the same time that due to lack of information about the external features and the rest of the skeleton, it was "Impossible to be certain of the identification".

For many years now fishermen have noted the appearance of what they have called the "Hump-back Dolphin" at Plettenburg Bay. This is a heavy animal, leaden grey in colour, which is slow in its movements and shows none of the playful tendencies of the Bottle-nose Dolphin, *Tursiops aduncus*, to leap out of the water. The most obvious feature of these animals when seen at sea is the humped back which bears the small sickle-shaped dorsal fin. Also characteristic is the long dive and the manner of surfacing. When the animals come up to breathe they lift their long, narrow beaks and sometimes their heads well out of the water twice, before submerging again.

In the last three years members of the Museum staff have noted the presence of the

Hump-back dolphin in Algoa Bay and Mr. C. K. Tayler has given me much information on their occurrence and habits at Plettenburg Bay. These dolphins normally move around in small groups numbering from six to fifteen and it appears that these groups are most frequently seen close in shore near rocks or over rocky bottoms and will linger in such a spot for a few hours. The majority of our records have been for the warm summer months from December to March but they have been seen in Algoa Bay in May and there has been a record of the presence of Hump-backs at Plettenburg Bay in July.

In mid-January, 1963 a shoal of about thirty of these dolphins was sighted in Algoa Bay. With the idea of catching some to keep in captivity in the Port Elizabeth Oceanarium, the staff managed to cut three off from the rest of the shoal and netted them without mishap on Kings Beach. The three dolphins, a male and two females, showed a resemblance to True's (1899) description, measurements and illustration of *Sotalia lentiginosa* and were accordingly classified as such.

The Hump-backs settled down nicely in the Oceanarium but after two months, without apparent reason, they lost their appetites and died. The cause of death is still unknown and post-mortems have revealed no clues. It is possible that they may have suffered from food

Fig. 1: Female Hump-back dolphin showing small flipper and extensive base to dorsal fin. The scale shown is in centimetres.

poisoning or a type of septicaemia but it is more likely that there was something lacking in their diet for we have since found that River dolphins of the same genus eat not only fish but also vegetable matter. Loss of appetite and general lethargy did coincide with a sudden drop in the water temperature and for animals accustomed to tropical waters this decrease might also have been fatal.

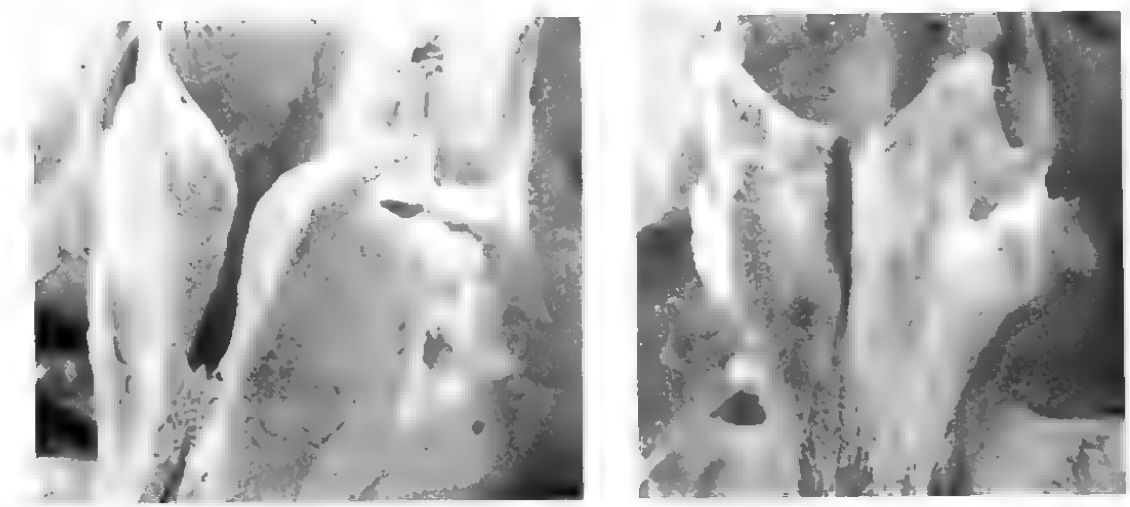
These dolphins compare in length with the Bottle-nose dolphin, *Tursiops* and our specimens ranged from 7 foot 6 inches to 8 foot 6 inches in measurement from the tip of the snout or beak to the median notch in the flukes. They were, however, more cumbersome animals with the greatest girth just anterior to the dorsal fin. This is well illustrated in Fig. 1. In colour they were slaty-grey with the undersurface lighter than the rest of the body. There were however no markings that would fit Owen's (1866) statement in his original description that the animal is "Freckled with irregular small spots or streaks of brown plumbeous pigment". The head of *Sotalia lentiginosa* bears several distinctive features. The eye is on the same vertical as the blow-hole, and the ear-hole, which is approximately 6 cm. posterior to the eye, is hardly discernable and is only evident as a pin prick on close examination. In contrast the external auditory opening of *Tursiops* is wider being 2 mm. in diameter and is apparent to even the casual observer. The so-called forehead which is in actual fact a cushion of tissue with a high oil content now known as the melon, curves steeply down to the beak which is particularly long in this species. Measurement shows it to be 0 076 the length of the entire animal as compared with the ratio 0 046 for *Tursiops*. In all three dolphins

the upper and lower jaws crossed distally so that the projection of the lower beak beyond the upper was not apparent. This feature was particularly pronounced in the eldest female. The flukes and flippers were similar in shape to those of *Tursiops* but the flippers were slightly smaller when we take the size of the animal into consideration. In *Tursiops* the flipper may be more than 13 per cent of the total length of the animal whereas in *S. lentiginosa* it is scarcely more than 11 per cent. Further, the dorsal fin which is falcate, is more curved at its apex in *S. lentiginosa* and has an extensive base which, posterior to the fin forms a median keel. It is this feature which accounts for the heaviness or great girth of the animal and has earned for it the name "Hump-back Dolphin". The close resemblance our specimens bear to Owen's (1866) and True's (1889) descriptions of *Sotalia lentiginosa* leaves no doubt that they belong to this species.

Features of the Skull

The skull of *Sotalia lentiginosa* is easily distinguishable from those of other dolphins in our area. There can be no confusing it with the smaller skull of *Lagenorhynchus* where the rostrum is depressed. The premaxillae of *S. lentiginosa* are rounded giving the rostrum an arched appearance. The rostrum of *Delphinus* is of comparable shape and length but the teeth are smaller and therefore more numerous in each tooth row. In *Delphinus* the teeth are 3 mm. in diameter and there are 45–50 on each side in each jaw whereas in *S. lentiginosa* there are 33–35 in each tooth row, and are 5 mm. in diameter. Further, the most obvious characteristic of the *Delphinus* skull is the grooved palate which *S. lentiginosa* does not possess.

The skull most resembling that of *S. lentiginosa* is that of *Tursiops aduncus*. Not only are their cranial capacities comparable but also the arrangement of frontal bones is similar and the teeth are of the same peg-like shape and size. In both species the temporal fossae are extensive but those of *S. lentiginosa* are sub-quadrate in shape and the frontal process forming the anterior border is more robust than that of *Tursiops* where the fossae are ovoid in shape. Further, the beak in *S. lentiginosa* is proportionally longer than that of *Tursiops* thus the tooth-row is lightly longer and there are more teeth in each row than in *Tursiops* where there are 23–25 teeth in each row.



A B

Fig. 2: Views of the inferior surface of the pterygoid bones of A, *Sotalia* which do not meet; B, of *Delphinus* which do.

The most distinctive feature of the skull of *Sotalia* is the formation of the pterygoid bones. Flower (1883) considered that the nature of the pterygoids was of prime importance in the classification of the Family Delphinidae where, in all members, these bones curl inwards to enclose an air-sinus between outer and inner plates. In *Lagenorhynchus*, *Delphinus* and *Tursiops* the wing-like pterygoids enclose a large sinus and are joined in the mid-line by their straight edges. The pterygoids of *Sotalia*, as shown in Fig. 2, enclose a smaller sinus and as the inner border of the inferior surface is not as wide as that in *Delphinus* or *Tursiops*, the pterygoid bones do not meet in the mid-line leaving a space between them.

We come then to the "Cape Town Skull" belonging to the genus *Sotalia* on account of its pterygoids being "Seperate behind but not widely or increasingly so" (Sclater 1901). Mr. M. J. Penrith of the South African Museum, Cape Town, has very kindly supplied me with photographs and measurements of this skull for comparison with our specimens and skulls of other *Sotalia* species. It is unlikely that the Cape Town skull belongs to one of the South American species of river dolphins as the cold South Atlantic currents would form a barrier to their migration to Southern Africa. On the other hand it is not improbable that river dolphins from the coast of India or China being caught in the Trade Wind Drift would eventually reach Cape waters by swimming with the Mozambique and Agulhas currents down the east coast of Southern Africa. Indeed the marine fauna of the East Coast of Africa has much in common with that of India and animals of Indo-Pacific origin, such as the sea

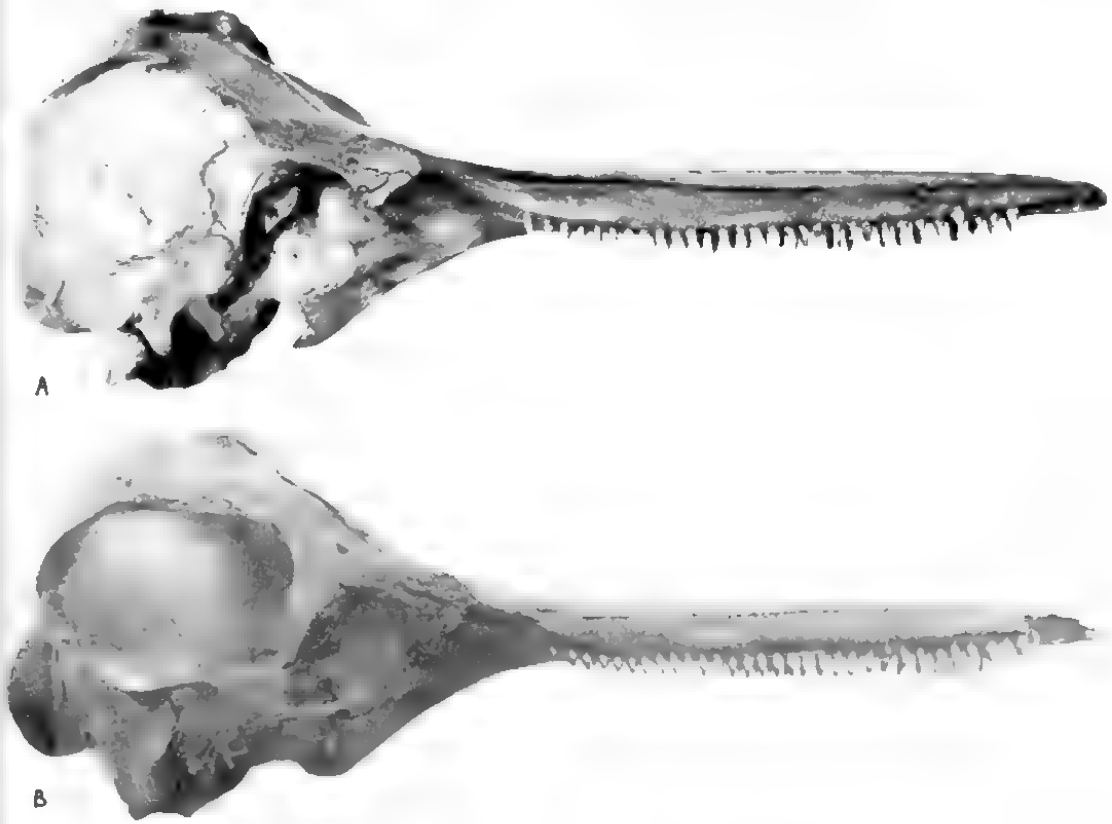


Fig. 3: Lateral Views of A, the Cape Town Skull; (Photo M. Penrith) B, *Sotalia* to show the temporal fossae.

snake *Pelamis platurus*, are not infrequently washed up on our shores. This skull could therefore belong to the *Sotalia* species *gadamu*, *plumbea lentiginosa* or even *sinensis* all of which occur in this region. The last mentioned, *S. sinensis* or Chinese White Dolphin has only been recorded from rivers flowing into the China Sea and their migration into Cape waters would involve a journey twice as long as that from India by a more tortuous route.

The number of teeth in each tooth row has been used as one of the criteria in distinguishing one species of dolphin from another. The possession of 33–34 teeth in each row of the Cape Town skull bars it from belonging to *S. gadamu* which has 25–26 teeth in each row and also from *S. sinensis* which possesses 30–32. In cranial characters the Cape Town skull resembles those of the species *S. plumbea* and *S. lentiginosa* where the number of teeth in each row are 33 37 and 33 35 respectively. However the temporal fossae of *S. plumbea* are distinctive being evenly circular in shape while those of *S. lentiginosa* are extensive and sub-quadrate. It is seen from Fig. 3 that the temporal fossae of the "Cape Town Skull" correspond closely in shape and extent with those of our specimens now identified as *Sotalia lentiginosa*. Furthermore, comparison of the measurements of the skulls of our specimens and the Type (True, 1889) with measurements of the Cape Town skull in Table 1 shows, that in all cases, though the skulls differ in size as indicated by the total length and the breadth between the orbits, the relative proportions are very much the same. Unfortunately material is limited but with what there is, it appears that there is no striking sexual dimorphism either in size or in the shape and arrangement of the bones of the skull of this species. It seems likely then that all the skulls belong to the same species, *Sotalia lentiginosa*.

TABLE 1.
A COMPARISON OF THE MEASUREMENTS OF FOUR *S. LENTIGINOSA* SKULLS

Sex	Type	Cape Town Skull	Port Elizabeth Specimens	
	?	?	Female	Male
SKULL	cm.	cm.	cm.	cm.
Total length	47·00	52·90	51·5	50·80
Length of beak	28·20	33·10	31·2	31·80
Breadth of beak:				
at maxillary notches	10·20	12·00	11·4	11·14
at its middle	4·70	5·30	4·9	5·00
Breadth of premaxillae at middle of beak	3·20	3·70	3·7	3·13
Length of tooth line	25·30	28·80	28·3	27·30
Tip of beak to anterior margin of superior nares	31·70	37·10	35·8	34·00
Tip of beak to end of crest of pterygoid	34·90	39·00	36·6	36·00
Breadth between orbits	17·40	21·00	18·3	18·40
Breadth between hind margins of temporal fossae	14·70	16·30	15·2	15·00
Length of temporal fossae	10·20	12·00	10·6	11·70
Depth of temporal fossae	8·00	10·60	8·7	8·50
MANDIBLE				
Length of mandible	39·90	48·10	42·8	42·00
Length of symphysis	12·10	11·90	12·1	12·00
Length of tooth tow	23·90	27·20	25·8	24·70
Depth between angle and coronoid process	7·90	9·80	8·5	8·30
Diameter of largest tooth	0·43	0·49	0·5	0·50
Number of teeth/row	34–34 33–34	34–34 33 32	35–35 33–33	36–36 33 33

Skeletal Characters

The skeletons of our specimens of *Sotalia lentiginosa* offer no outstanding features and Gray's (1866) description for the genotype, *Sotalia guianensis* needs little alteration. There are 55 vertebrae: 7 cervical, 12 thoracic, 14 lumbar, and 22 caudal. Of the cervical the first, the atlas is the most robust with a substantial neural spine and large facets anteriorly for articulation with the occipital condyls of the skull. To it the centrum of the second cervical vertebra is fused but its neural arch is quite distinct from that of the atlas. There follows a series of five cervical vertebrae with their disc-shaped centra and wide neural arches, the third of which has a stout process off the centrum.

The 12 thoracic vertebrae which follow form a series in which the transverse processes for the attachment of the ribs increase in length from anterior to posterior. Also, anteriorly the metapophyses are insignificant projections from the anterior border of the transverse processes while posteriorly they form wing-like processes near the apex of the neural arch. The centra of the thoracic vertebrae are sub-cylindrical in shape and though the neural arch decreases in extent posteriorly, the neural spines become longer. The sternum or breastbone and ribs conform to type.

Among the 14 lumber are found some of the largest vertebrae. Typically they are robust with stout transverse processes and neural spines. The wing-like metapophyses are drawn together and the neural canal is reduced.

In series the caudal vertebrae show a gradual reduction in vertebral characters. The transverse processes of the tenth are hardly discernible and the neural canal is much constricted. The thirteenth has lost all trace of neural arch and neural spine. The last nine caudal vertebrae (14–22) differ from the others in that they are much depressed being twice as broad as they are high. There are 12 well developed chevron bones.

The pectoral girdle and limb structure are as in *S. guianensis* but I have found that in our specimens of *S. lentiginosa* the manus differs in the number of phalanges. In our specimens, as in the genotype, the radius and ulna are flattened and rather longer than the truncate humerus. The five carpal bones are arranged in two rows, the three proximal ones being the largest. There are five metacarpals. There is no first digit, the second digit has six phalanges, the third has five, the fourth has three while the fifth has two phalanges.

The pelvic girdle, as in all Cetacea, is reduced to two pelvic bones lying loosely in the lower abdominal cavity.

From the above description it can be seen that there are no features of the skeleton that characterise the species *Sotalia lentiginosa* but evidence drawn from a study of external appearance and cranial characters indicates that our specimens of the so-called Hump-back dolphins belong to this species. Thus it can now be stated that dolphins of the species *Sotalia lentiginosa* are not only confined to the rivers and coastal waters of India but have a far wider distribution as they are found in sub-tropical seas as far south as Algoa Bay and Plettenburg Bay. It is not impossible for some to venture as far as False Bay but this remains to be proven as the "Cape Town Skull" found washed up at Muizenberg remains a doubtful record. There need be, however, no more hesitation in including *Sotalia lentiginosa* in future catalogues of South African whales and dolphins.

SUMMARY

The regular occurrence of the "Hump-back Dolphin", now identified as *Sotalia lentiginosa*, at Plettenburg Bay and Algoa Bay is recorded. The field characters and external appearance of this dolphin are described.

The skull of this species is compared with those of other dolphins found in South African waters and attention is drawn to the most salient features. A few remarks are made about a skull washed up in Flase Bay in 1896 and identified as *Sotalia lentiginosa*.

A brief description is given of the post-cranial skeleton of *Sotalia lentiginosa*.

Acknowledgments

I am indebted to Dr. G. R. McLachlan who first became interested in this species and whose notes and records I have used in the preparation of this paper. I should also like to express my gratitude to Mr. R. Liversidge for suggestions and criticisms and for his help with photography. My thanks also go to Mr. M. J. Penrith and Miss M. L. Wapenaar of the South African Museum for their assistance with photographs and measurements of the "Cape Town Skull".

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A. C. van BRUGGEN

NATAL MUSEUM,
PIETERMARITZBURG.

A Re-Examination of the Types of Recent Mollusca of the Port Elizabeth Museum

(*Accepted 7th December, 1961*)

At the 14th International Congress of Zoology at Copenhagen, 1953, it was recommended that institutions should publish lists of type material in their possession. Since the Port Elizabeth Museum never concentrated very much on research of a taxonomic nature few types will be found in its study collections. The few types of molluscs, however, are sufficiently important to warrant some short notes[1].

Gastropoda Prosobranchia

Afrivoluta pringlei Tomlin

Voluta spec. indet., Thiele, 1925, p. 199, fig.
Afrivoluta pringlei Tomlin, 1947b, p. 244, fig.; Koch, 1950, p. 243, fig.; Barnard, no date (1951), p. 63, fig.
Voluta (*Afrivoluta*) *pringlei*, Barnard, 1959, p. 24.

Tomlin erected the genus *Afrivoluta* for this species, subsequently reduced to subgenus rank by Barnard (1959), who gives full particulars. Since none of the existing figures are wholly satisfactory, new illustrations of specimens in the Port Elizabeth Museum are given here (figs. 1—5).

The exact measurements of the holotype are as follows: length 104 mm. (Tomlin: 4¼ inches — 108 mm.), diam. max. 37 mm. (Tomlin: 1½ inches — 38 mm.), length of aperture 79 mm. (Tomlin: 3 inches — 76 mm.), max. width of aperture 14 mm. (Tomlin: 9/16 inches — 14 mm.).

The specimen (figs. 1 and 4) is in excellent condition; the outer surface is shiny except for the dull callus. Actually, Tomlin's photograph gives a false impression because there is a marked contrast between the callus and the other parts of the shell which is not shown in his figure. The shell is slightly worn and the pattern must have lost some of its bright colours; apparently the adult shell in the South African Museum (*vide* Barnard, 1959) and another specimen in the Port Elizabeth Museum (Cat. No. 1461/70, see below) show the pattern in its

[1] In addition the Port Elizabeth Museum possesses the types of a fish (*Halieutichthys fitzsimonsi* Gilchrist & Thompson) and some fossils.

(*Photos:* K. R. Foden)
Figs. 1–3. Afrivoluta pringlei Tomlin. 1. Holotype. 2. Cat. No. 1431/18. 3. Cat. No. 1461/70.

full brightness. The pale bands on the body whorl are 13—14 mm. wide with a space of only 3 mm. in between. The lower band is as a rule more clearly marked than the upper.

The holotype bears the catalogue number 1459/43 and the label reads in the handwriting of Dr. J. A. Pringle: "Taken at 120 fathoms in Algoa Bay"; the catalogue gives the collector's name as J. Le Roux from the fisheries firm Irvin & Johnson, so presumably the specimen was obtained from a trawlnet.

There are four more lots of *Voluta pringlei* in the shell collection of the Port Elizabeth Museum. The data of these are as follows:

Cat. No. A1/39, 20 miles south of Cape Recife, 140—150 fathoms, 5th May, 1939, Captain Martin of Irvin & Johnson, two worn specimens[2];

Cat. No. 1431/18 – A2/35, S.E. of Cape Recife, 120 -150 fathoms, 20th June, 1939, J. Le Roux of Irvin & Johnson, one specimen;

Cat. No. 1461/70, off Tzitzikama coast, 70 fathoms, J. Le Roux of Irvin & Johnson, one specimen;

Cat. No. 1486/62, Blue Bank, Algoa Bay, 150 fathoms, 1953, one rather worn specimen.

[2] Cf. the data of the type of *Fusitriton algoensis* Tomlin.

All measurements may be tabulated as follows:

Cat. No.	*length*	*diam. max.*	*length ap.*	*max. width ap.*
A1/39	119·5	43·0	91·0	17·5 mm.
1486/62	118·3	40·5	87·0	15·0 mm.
1431/18	112·0	41·0	84·4	16·0 mm.
A1/39	105·6	39·0	80·0	15·5 mm.
1459/43 (Type) ..	104·0	37·0	79·0	14·0 mm.
1461/70	99·3	41·7	82·0	16·0 mm.
Barnard, 1959 ..	120·0	45·0	—	— mm.

(*Photos:* K. R. Foden)

Figs. 4–5. *Afrivoluta pringlei* Tomlin. 4. Holotype. 5. Cat. No. 1461/70.

The soft parts are as yet unknown, but apparently the shells of the species are not altogether rare in Algoa Bay. The correct name for the species is *Voluta* (*Afrivoluta*) *pringlei* (Tomlin).

Fusitriton algoensis Tomlin

Lampusia (*Priene*) *murrayi* Smith, 1891, p. 436, fig.
Argobuccinum (*Fusitriton*) *murrayi*, Thiele, 1929, p. 281, fig.
Fusitriton algoensis Tomlin, 1947a, p. 245, fig.; White, 1948, p. 3, figs.

Fusitriton murrayi, Barnard, 1949, p. 90, fig.; Koch, 1950, p. 243, fig.; Barnard, no date (1951), p. 86, fig.

The exact measurements of the holotype in the Port Elizabeth Museum are as follows: length 116 mm. (Tomlin: $4\frac{3}{4}$ inches = 121 mm.), diam. max. 53 mm. (Tomlin: $2\frac{1}{8}$ inches = 53 mm.), length of aperture without canal 49 mm. (not given by Tomlin), max. width of aperture 30 mm. (do.).

The specimen which evidently has lost its periostracum, is in good condition, although the very first apical whorls have been lost. Very probably there may have been more than the eight whorls recorded by Tomlin. Attention has to be drawn to a hump or rather ridge on the parietal wall near the tip of the aperture. This is only faintly shown in Tomlin's and Barnard's (no date, 1951) figures; this swelling is about 3 mm. high, but shows much individual variation, which may be connected with age. None of the other above-mentioned figures show the ridge in question, but all 18 specimens examined possess this feature. All whorls may show varices. Thiele's and Barnard's (1949) figures of the radula are almost identical.

The type bears the catalogue number 1459/86; it was obtained from Captain Martin of Irvin & Johnson on 5th May, 1939, and the catalogue entry reads: "Trawled 20 miles South of Cape Recife at 140 fathoms". In the description of the anatomy of the species (White, 1948) mention is made of two specimens, one of which measures 12 × 5·7 cm. Presumably one shell has been retained or destroyed in the process of dissection by either Tomlin or White, although Tomlin only mentions the holotype belonging to the Port Elizabeth Museum; the type specimen has no operculum with it.

There are some more samples of the present species in the Port Elizabeth Museum, viz., A1/37 and 1450/37 (one and three specimens respectively, same data as type), A2/18 (four specimens, trawled at 150 fathoms, 25 miles off Cape Recife, August, 1945, G. C. Haines) and 1468/67 (nine specimens, trawled at 180 fathoms, 40 miles off Cape Recife, 28th April, 1952, D. Henderson). The specimens of Henderson (and some others as well) were apparently collected alive, since the majority still retain the greyish-brown periostracum with 1–1·5 mm. long hairs and some opercula are also present. There is a good deal of variation and since not very much is known about the species the measurements may be tabulated as follows:

Cat. No.	*length*	*diam. max.*	*length ap.*	*max. width ap.*
1450/37	127·4	55·0	49·0	34·0 mm.
1459/86 (Type) ..	116·0	53·0	49·0	30·0 mm.
A2/18	116·0	48·5	46·0	29·0 mm.
A2/18	115·5	47·0	45·0	30·5 mm.
1450/37	114·6	54·0	48·0	30·8 mm.
1468/67	114·5	49·0	46·0	32·5 mm.
A1/37	113·0	49·0	49·0	30·0 mm.
1468/67	110·0	46·0	46·0	32·0 mm.
1468/67	109·5	44·5	42·5	28·0 mm.
1468/67	109·0	43·0	41·0	27·5 mm.
1468/67	108·0	46·0	44·0	29·0 mm.
1468/67	106·5	44·5	41·5	25·5 mm.
1450/37	106·2	49·0	42·7	27·0 mm.
1468/67	106·0	44·0	42·0	28·5 mm.
1468/67	105·0	45·0	42·0	27·5 mm.
1468/67	104·5	44·0	44·0	28·0 mm.
A2/18	99·0	44·0	43·0	29·0 mm.
A2/18	apex and canal broken	48·0	41·0	29·0 mm.
TYPE Smith ..	87·0	43·0	—	19·0 mm.

The apex of almost all specimens has been broken or is worn; therefore, as a rule, a few mm. have to be added to the total length. The length of the aperture has been taken without the canal.

The correct name for the species is *Fusitriton murrayi* (Smith); a re-examination shows again that there is no reason to retain Tomlin's name, since the very few differences between Smith's specimen and those under discussion are insignificant and due to individual variation.

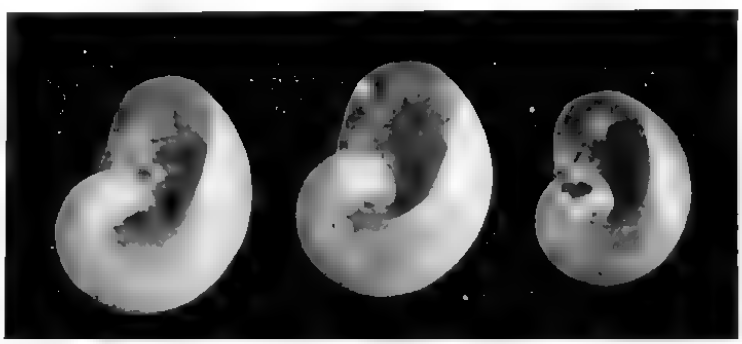
Gastropoda Pulmonata

Helicarion (*Granularion*) *pitmani* Connolly

Helicarion (*Granularion*) *pitmani* Connolly, 1925, p. 465, figs.

There is a sample of shells of this species in the Port Elizabeth Museum marked "paratypes". Connolly mentions only the type "in coll. Cribb"; however, he gives measurements of another specimen, so possibly he examined more than two specimens. Strictly speaking, only the second specimen mentioned by Connolly is a paratype. On the other hand, if the present specimens originally belonged to the type series studied by the author, there is no harm in calling them paratypes.

The specimens have been collected by Captain C. R. S. Pitman in Kenya, Trans-Nzoia District, Cherangani Hills, 6,200 ft. They have been acquired by the museum, together with a large number of other East African land and freshwater shells, from Capt. Pitman in 1945. The present author has entered them in the general catalogue under No. 1487 81.



(*Photo:* K. R. Foden)

Fig. 6. *Helicarion pitmani* Connolly. Three paratypes belonging to the Port Elizabeth Museum.

The shells are very fragile and only two are still in perfect condition (fig. 6). The measurements are as follows:

Specimen	*max. height*	*diameter*
Fig. 6 (centre)	8·5	13·8 × 10 mm.
Fig. 6 (left)	8·0	14 × 10·4 mm.
Damaged specimen	8·0	14 × 10·5 mm.
Broken specimen	—	12·5 × 9·5 mm.
Fig. 6 (right), juv. dam.	7·1	11·4 × 8·6 mm.
Connolly type	8·5	14 × 10·2 mm.
Connolly paratype	9·2	15·7 × 12·6 mm.

The specimens agree with the description in every respect.

According to Zilch's (1959) manual the correct name for the species is *Zonitarion* (*Granularion*) *pitmani* (Connolly), fam. Urocyclidae, subfam. Trochozonitinae.

LAMELLIBRANCHIA

Barnea durbanensis Van Hoepen

Pholas alfredensis Bartsch, 1915, p. 210, figs.; Turton, 1932, p. 258.
Barnea alfredensis, Van Hoepen, 1941, p. 168, figs.; Barnard, no date (1951), p. 166, fig.
Barnea durbanensis Van Hoepen, 1941, p. 169, figs.

The Port Elizabeth Museum possesses only the left valve mentioned by Van Hoepen on p. 171. It must be considered a paratype according to Van Hoepen, because it has been used in the original description of the species. It measures 75 × 25 mm. and is in rather worn condition; small fragments of both ends have been broken off. It has been entered in the catalogue under number 1430/39 and labelled "Algoa Bay" only. A critical examination of this and other specimens shows that the status of the species is still open to discussion. According to Van Hoepen *Barnea durbanensis* and *B. alfredensis* (Bartsch) differ only in minor details of the denticles or scales on the concentric lamellae and radial ribs at the anterior end of the valve. In my opinion this does not justify the separation of both species because the few differences are due to individual variation. Therefore *B. durbanensis* has to be sunk into the synonymy of *B. alfredensis*.

Pholas jordani Van Hoepen

Pholas dactylus Sowerby nec Linnaeus, 1892, p. 54.
Pholas jordani Van Hoepen, 1941, p. 171, figs.; Barnard, no date (1951), p. 166, fig.

Notwithstanding Van Hoepen's paper there is still a great deal of confusion about the systematic status of the South African *Pholas* species. The Port Elizabeth Museum has in its collection two valves, a left and a right one, that are paratypes of *Pholas jordani* Van Hoepen. The left valve has been figured by Van Hoepen on Plate 9, fig. 5. Both valves have been entered in the catalogue under No. 1430/37 and are labelled "Algoa Bay". They measure 95 × 29 and 89 × 28 mm. Extensive series of both the species under discussion and the European *Pholas dactylus* L. are required for comparative studies to settle the position of the South African species.

SUMMARY

The following Mollusca types in the Port Elizabeth Museum are discussed: *Afrivoluta pringlei* Tomlin, *Fusitriton algoensis* Tomlin, *Helicarion pitmani* Connolly, *Barnea durbanensis* Van Hoepen and *Pholas jordani* Van Hoepen.

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Notes on two Species of *Cymatium* in South Africa

(*Accepted 26th November, 1962*)

The East London Museum possesses a large number of specimens of the *dolarium/africanum* group, and this paper presents the data obtained from a study of these shells.

In the plates the shells are shown slightly larger than actual size, but the measurements quoted are of the specimens depicted.

Cymatium dolarium, (Linn). Plate 1, 1 inch, 2 inches and 2 inches.

This common species is found in all stages of growth, from half an inch to average adult size as illustrated.

The largest specimen seen by the writer is 2½ inches in length. It is noted from the shells examined that the sculpture remains the same at all stages of growth, and fresh dead shells have a dense greenish furry periostracum.

Cymatium africanum, (A. Adams). Plate 2, 1 inch, 2 inches and 2 inches. Plate 3, 2½ inches and 3 inches.

Examination of a large series of shells, reveals that *africanum* may be divided into two "forms". One is the usual variable form, and the other an "elongated" form, which does not appear to have been illustrated, or described, hitherto.

The "elongate" form is found from juveniles of ¾ inch to adults measuring up to 3½ inches in length. In the series of shells examined no difference in sculpture was found, and two of the largest are illustrated in Plate 3.

Plate 2 shows three specimens of the most variable of the *africanum* forms. The series of shells examined shows the sculpture of one—sometimes two of the early whorls, to be identical with *dolarium*.

The body whorl then becomes almost or quite smooth, with blunt nodules on the shoulder.

In general this "form" usually is much broader than the "elongate" form, and the width nearly equals the length.

One specimen examined measures 2½ by 2 inches, and larger but damaged examples have been seen on beaches near East London.

A number of shells of about 1½ inches exhibit sculpture partly that of *dolarium*, and partly *africanum*. It is difficult to assign these examples to either species. One shell in particular shows the typical *dolarium* sculpture to exactly half way round the body whorl. At this point,

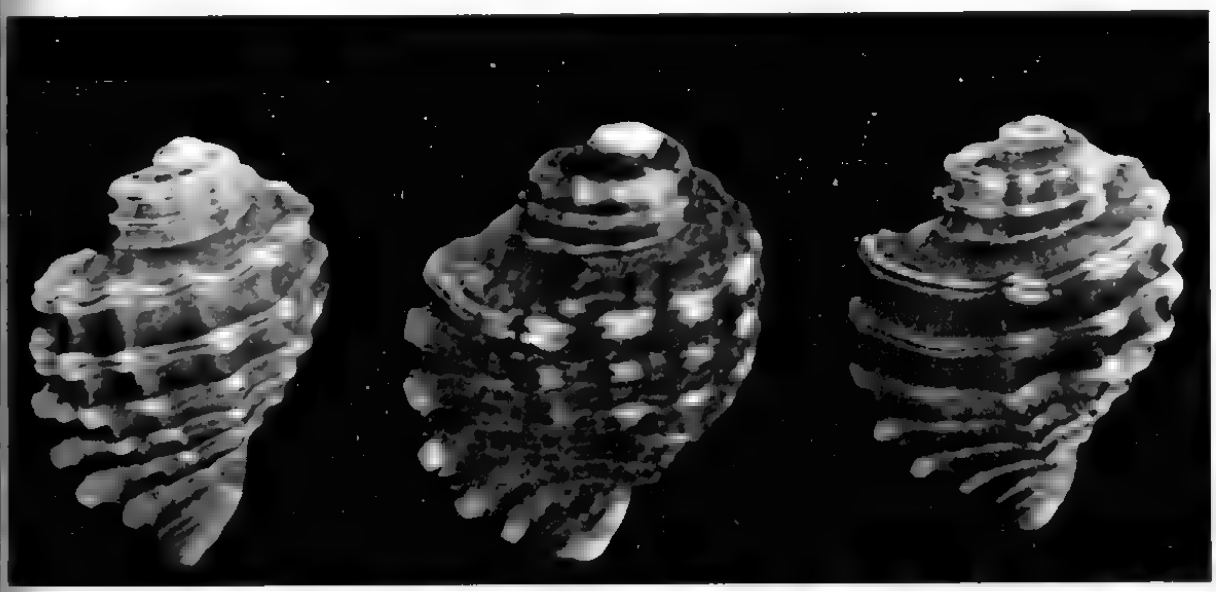
on a perfectly straight line, the sculpture becomes quite smooth. There is no sign of injury, or mending of a break, and the animal has proceeded with normal growth.

The Director of the East London Museum, (Miss Latimer), observed a rock pool at Bird Island some years ago, where examples of *dolarium* and *africanum* were living together.

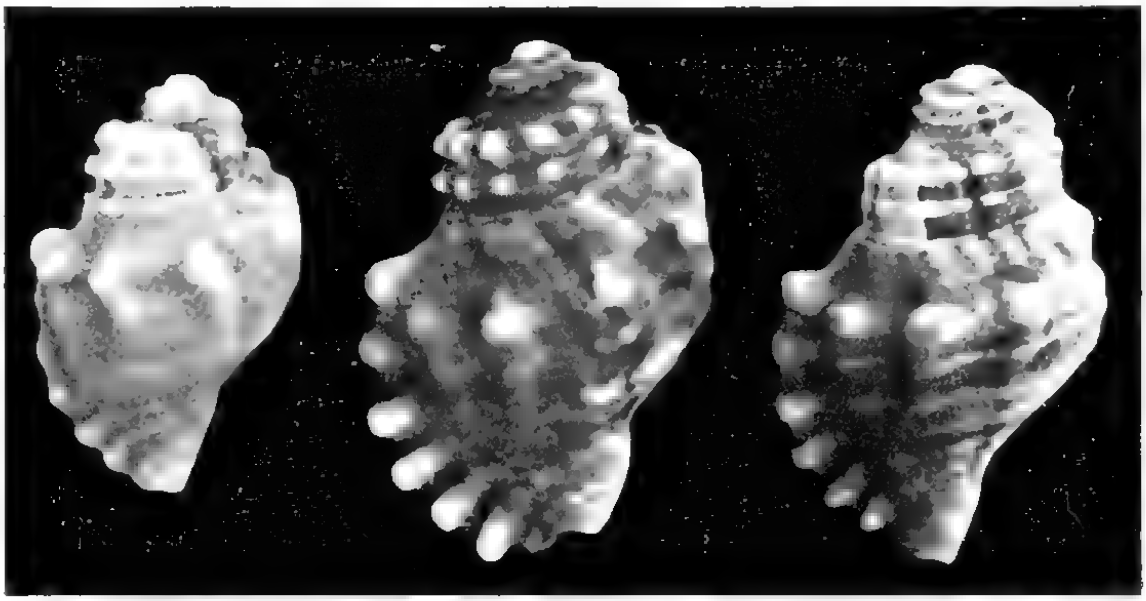
Summary

The examination of the large series of shells, appears to reveal interbreeding between the well-known *dolarium*, and the "elongate" form of *africanum*. Should this be proved it would account for the extremely variable form of *africanum* shown in Plate 2.

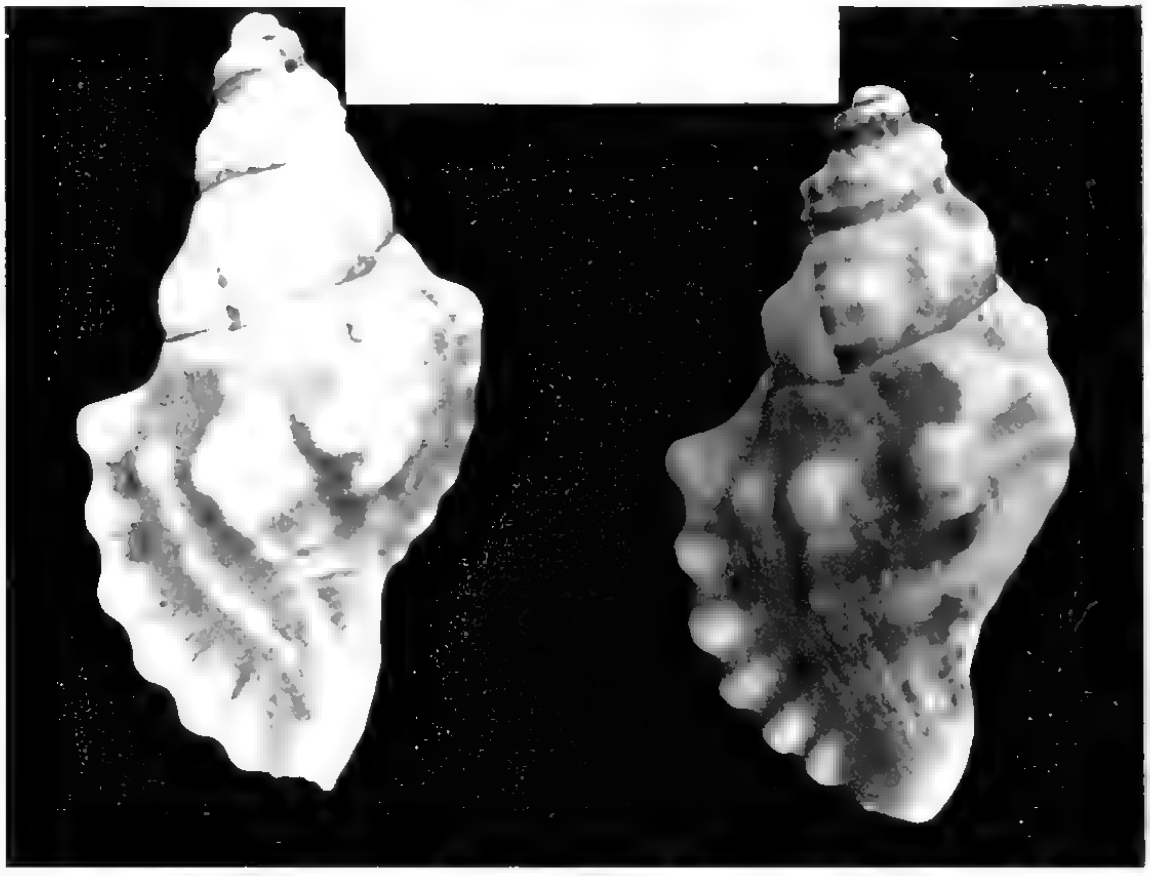
Further investigation of living examples of these shells will without doubt solve the problems arising from a study of the shells only.



Cymatium dolarium X 1.2. (*Photo:* G. G. Smith)



Cymatium africanum X 1.2 (*Photo* G. G. Smith)
Usual variable form.



Cymatium africanum X 1.2 (*Photo* G. G. Smith)
Elongate form

M. de LANGE

EAST LONDON MUSEUM.

Some Traditional Cosmetic Practices of the Xhosa

(*Accepted 4th January, 1963*)

Introduction

The Xhosa live in the coastal districts of the Eastern Cape Province, including the districts of Kentani and Willowvale in the Transkei, and the Komgha, Stutterheim, East London and King William's Town districts in the Ciskei. Some Xhosa are found in the adjoining districts, but in these the Xhosa are not the predominant racial element. Most of the material for this article was collected in the East London district, with subsidiary information from locations in the Komgha, Kentani and Willowvale districts.

This article refers to the traditional practices of the Xhosa; the dressed Xhosa do not use these cosmetics. When they wear cosmetics the European types are preferred. The girls have their hair artificially straightened and use European cosmetics in the same way as Europeans do. "Red" Xhosa sometimes employ European cosmetics, but use them in traditional Xhosa fashions. A study has not been made of dressed Xhosa in the native reserves, but in East London a dressed Xhosa woman with ochre on her face is likely to be a "red" Xhosa wearing European clothing while temporarily in town.

The traditional cosmetic arts practised by the Xhosa include the use of colour on bodies and clothes and an appreciation of pattern achieved by means of paint and scarification. The attraction of a pleasant scent is also employed to a certain extent. They do not as a rule practise any form of hair styling; males and females keep their hair cropped short. Cosmetics are typically employed by girls and young matrons, the young men usually enhancing their appearance by means of the beadwork made for them by their sweethearts. Such medicinal plants as are used to improve the complexion yet are not considered ornamental or attractive, are not discussed in this article. Neither are those European cosmetics which are being increasingly adopted.

The sources of the cosmetics are coloured mineral substances and various vegetable products. To a small extent animal fats are also employed. Some of these cosmetics are native to certain localities, and enjoy only a local appeal, while others are general and can be procured at any trading station. Considerable distances are travelled in order to procure the necessary commodity. The colours used by the Xhosa are tones of red, yellow, white and occasionally blue and black. The use of these cosmetics is not indiscriminate. Custom dictates to some extent when cosmetics must be used, what colours to apply, and what design to adopt. However, when custom is not involved individual preference may be indulged.

The Xhosa are a conservative people and tradition determines the form of cosmetic ornamentation to an extent; on the other hand the young people are keen to try new products and often introduce new fashions in cosmetics. The new fashions sometimes modify the old practices, even where ritual is involved.

Where cosmetics are worn for ritual purposes, their significance may be as an emblem denoting a particular ritual state, and the colour may have a symbolic meaning.

The various cosmetics are not strictly allotted to different age groups, although cosmetics favoured by the young people would not generally find favour with the older folk, who adhere to the traditional forms. Although certain colouring substances used on the face are supposed to have medicinal properties, others are admitted to be harmful to the complexion and are preferred as dyes for clothing. There are also cosmetics used for their reputed magical powers.

Mineral Substances

The majority of cosmetics consist of various types of ochre. These are readily procurable in trading stores, where the red types especially are a stock-in-trade and are constantly in demand as a dye for the kaffir-sheeting clothing (*ibayi*). These ready-ground ochres are often imported, e.g. from England, yet generally approximate to an ochre procurable at certain sites in the Xhosa territory, and enjoying an age-old popularity. Barrow (1801) mentions the False River, a tributary of the Gouritz, as one of the sources of yellow and brown ochres; and Steedman (1835) says that considerable journeys were undertaken to procure red clay from the vicinity of the Fish River. Where there is a local quarry, the product forms a subsidiary supply for the neighbourhood. There is no standard colour which is favoured universally, and fashions change so rapidly that suppliers to the traders find it impossible to keep them supplied with the exact shade in demand. Preferences alter from district to district within the same tribal group, but in general the Transkeian Bantu prefer the bluer reds and the Ciskeians the yellower reds. In a general way a comparative chronology regarding the history of colour preferences can be devised from the age of buyers, the youngest age-group preferring the latest colours. Informants attest that these ochres are properly dyes, and unpleasant to wear on the face, being harsh and drying. They are nevertheless frequently used for facial decoration, and a coating of vaseline is sometimes applied to those parts of the face which will be covered with ochre. The natural colour of the skin is hidden beneath the layer of ochre, giving very bright colours. Called by the generic name of *imbola*, the different shades have specific names. The following are the main types:—

Ucumse:

This is the name given to magenta iron oxide. Always popular, it can be bought in the trading stations in a granulated form, ready for use. The traders sell an ochre imported from Winford, England, but *ucumse* is also quarried at various places by the Xhosa themselves, for example around Mazeppa Bay. A piece of metal which has been flattened and sharpened, called *ulugxa*, is used to dig the ochre out of the ground, after which it is carried home in sacks. The women then grind it to powder between two millstones. This ochre is used as a dye, and for this purpose a quantity is added to a basin of water and the clothing kneaded in this mixture. The article is laid out to dry on the grass, upon which it becomes stiff. The garment is then rolled in a sack and beaten with sticks by a couple of women. It is unrolled, shaken out and hung up to air. Several dippings are required before the garment acquires the desired shade. Old blankets, which when bought were dyed a brighter colour, are eventually dyed with *ucumse* and worn when working in the fields, as its dark hue disguises the dirt. For full-dress occasions it is not popular, although still worn by the older women. Xhosa informants considered dark red clothing typical of the Mfengu, who use fat together with ochre in dyeing.

Especially when prepared in this manner, the cloth skirts resemble the old-fashioned ox-hide skirts (*isikaka*) which are still considered the dress *par excellence* for great occasions. Kay (1833) mentions that dark ochre was used in the preparation of *isikaka*.

Umakaba:

This is a name given to the lighter-toned oxides or clays which are found in a natural state at various localities, and does not seem to refer to any particular colouring. One product called by this name is a light red clay which can be collected around Komgha. It is moistened and shaped into a ball by the hands and dried for storage. Dyes of a similar bright red shade which were collected from sites in the Willowvale and Tsolo districts were merely referred to by local users as *imbola*. *Umakaba* is the name given by local informants to a pale yellow ochre which is a heterogeneous compound of white and yellow oxides quarried at Black Rock, near Haga-Haga. These ochres are sometimes sold to the trading stations, where they can be bought by people from other areas. The vermillion ochre which is so popular, and which is stated in many neighbourhoods to be available only at the trading station, appears to be either this same *umakaba* or an imported product which closely resembles it. A rust-red variety is quarried and prepared commercially in Natal. At Willowvale this shade was called *inewlook*, which suggests that the fashion is of fairly recent adoption there. One sees clothing dyed to different intensities of red, but I was not able to ascertain satisfactorily whether different types of *imbola* were responsible for this difference in hue. All the *umakaba* oxides are procurable from South African quarries, and vary greatly in hue. Barrow (1801) remarked that ". . . there is scarcely a mountain in Africa that does not produce iron ores; and ochres are everywhere found in the greatest abundance", and goes on to describe the forms these ochres take, adding "In these stones every shade of colour is said to have been found, except the greens, but the most common are those of pale yellow and chocolate brown." They are mixed with water and used as a dye in the same way as *ucumse*. New blankets are usually dyed with *umakaba*, the bright reds or pale yellows being generally considered the most fashionable. It is used by the younger married folk as well as the youngsters. This ochre is not properly a facial cosmetic, but can be seen patterning the faces of young women at feasts, where it is frequently painted around the eyes.

Umtoba:

This is dark yellow ochre not available in quarries in the Xhosa territories as it is in parts of Namaqualand and the Transvaal. *Umtoba* from sites in the Transvaal is prepared commercially for the Xhosa trade. It seems to be a new fashion which has been adopted by the young unmarried girls (*iintombi zamakwenkwe*) to a certain extent. Lichtenstein (1815) remarked on the use of "deep yellow iron oxide" in Bechuanaland, either dusted on the face or applied in facial patterns; it is interesting to note that the Xhosa use yellow ochre in a similar fashion. They pat the powder all over their faces, or else a little ochre is made to a paste with water and applied in fanciful decoration to their cheeks. At Mooiplaats a young married woman was seen with *umtoba* around her eyes as part of her festive dress, while at Willowvale it was seen as a decorative smear on the forehead of a small child. The Xhosa do not use it as a clothing dye, although yellow is now a popular colour among neighbouring tribes, e.g. all age-groups of the Bomvana of Elliotdale, for clothing and beadwork. Kay (1833) and Dr. Andrew Smith (Kirby, 1955) in 1832 both noted the use of yellow paint or earth as facial decoration among the Mpondo. The conservative Xhosa have been slower to adopt this colour; they seem to regard it as an innovation permissible to the younger set, but not at all as satisfactory as the traditional red. The yellowish red ochre popular as a dye in the districts of King William's Town and Peddie, which appears to be burnt yellow ochre bought at trading stations, is called by the users *umtoba*.

IBLOWU:

This is ordinary Reckitt's Blue which is bought at the trading stations and reduced to a paste with water. It is used only on the body, in small quantities generally, to add colour to elaborate facial patterning. It seems to be regarded as especially appropriate when white is being used on the face, and so is considered permissible to the initiates into manhood (*abakhwetha*). Fine touches of blue are applied by means of a small stick or quill.

IMSIZI:

The grime from the bottom of cooking-pots, which is wiped off with the fingers and applied to the lips. It is used by males and females as part of their toilet. It is also permitted to the *abakhwetha*, who sometimes paint their eyebrows with it when covered with white clay. Informants maintain that the Xhosa do not make a black paint. However, Cook (1931) states that old Bomvana could remember when the Gcaleka of Willowvale, and then the Ngqika of Kentani, adopted the custom of elaborately painting the *abakhwetha* with blue, red and black paint (called *imsizi*), and suggests that the custom was acquired at the mines. My informants were inclined to stress the traditional usages.

INGXWALA:

The name for the white kaolin clay found at many sites along the South East coast; for example, at Thorn Park, near Kidds Beach. It is not bought. Being essential to various ritual conditions, however, considerable distances will be travelled to procure it. It is reduced to a creamy paste by moistening a piece of the kaolin and rubbing it on a grinding-stone. This paint is frequently used in fine patterns on the face by the women at social gatherings, and also sometimes painted on their arms. The young girls decorate their faces with intricate patterns, the *ingxwala* being applied with a fine stick or quill, usually in the form of a white design on each cheek to which traces of other colours may be added. The use of *ingxwala* is imperative to various rituals, e.g. to nursing mothers (*abadlezana*) and their babies, novices and diviners (*amagqira*), and *abakhwetha*.

ICHITYWA:

This is a hard red ferruginous shale. It is found in stony places in an iron soil. The stone is moistened and rubbed on a grinding-stone, water being continuously added, and a creamy lotion is formed. This lotion is used solely as a body cosmetic. It is plastered on the face and when dry the caked portion is flaked off and the residue is rubbed into the skin. *Ichitywa* is supposed to be soothing to the skin. The women often cover the exposed parts of their bodies with it when they go to cultivate their fields, as a protection against the sun and dust; they frequently rub it on their cheeks like rouge. It is to be seen covering the bodies of the girls when they attend important functions at which they dance wearing no covering over the breasts, to impart to the skin an attractive appearance and silky feel. On these occasions they do not use *ichitywa* on their faces. *Ichitywa* is especially used by the *abakhwetha* after their return from the *itonto* (lodge); i.e. by the *amakrwala*, who cover their bodies with this paint. Each boy has his own grinding-stone to make the cosmetic, for the treatment is essential to his social position.

VEGETABLE COSMETICS:

Such colouring matter as is produced from vegetable sources is used on the face, and there are no vegetable dyes produced for the dyeing of clothing. Those which are used are considered to possess medicinal or even magical properties. There is also a wood which is valued for its pleasant scent.

Isibindi:

This is the name of a bracket fungus which is found growing on such trees as the *Combretum erythrophyllum*. The fresh fungus is chopped from the tree and is rubbed on a grinding-stone while water is added to form a mustard-yellow lotion. This is smeared on the face and dries to form a slight film on the skin. *Isibindi* is considered of therapeutic value, and is recommended in cases of acne, where it is apparently successful. The freshness of the fungus evidently determines the colour of the lotion; the older fungus produces a dark brown liquid. The yellow-producing variety is used by the *amakrwala* as part of the treatment to restore their skin, subsequent to the use of the rather harsh *ichitywa*. It is used by anybody, male or female, as part of their toilet.

Imbendulu:

This is a plant, probably of the *Polygala* sp. The roots are collected and dried and broken up into pieces. When the cosmetic is required the dried roots are pulverized while water is added to produce a bright yellow dye. It is supposed to be beneficial to the complexion, but more important, to have the magical ability to attract to the wearer the affection of the opposite sex. The young boys put it on their faces when they go visiting. *Imbendulu* was the name given to the plant by an informant at Black Rock, where a specimen was collected, but the same or similar plant was called *umbiza* at Kei Bridge, and *bınkana* by the Mpondomise at Zingcuka location in the Tsolo district, where it was used for the same purpose.

Umthombothi:

This is the name given to a tree (*Spirostachys africanus*) whose wood has a pleasant smell. Branches are taken home and cut into slivers about three inches long which are strung together to form a necklace which is worn by nursing mothers. To form a cosmetic, pieces of the necklace are broken off and ground to powder. This is used like talcum powder, or the granulated wood may be mixed with water and applied to the mother's face and added to the baby's washing water. It is used for its scent, but it does not appear that this cosmetic is ever used by anyone but the mother and her baby. The solution is coffee-coloured and does not show up on the skin, and so has no attraction as far as appearance is concerned.

Animal Fat:

Both types used, fat from meat and butter, are called *amafuta*. Animal fat was previously much used by the Xhosa on their bodies and on their clothing, as is affirmed by Kay (1833) who describes the method of preparing oxhide garments with the aid of ochre and grease. It hardly finds a place among their cosmetics to-day. Most Xhosa people seemed rather disgusted by the idea, and said it was a custom of the Mfengu to use fat when dyeing cloth apparel. Fat is skimmed out of the cooking pot when meat is being boiled, and is kept in a can, or other convenient utensil. I could not discover that it is purified in any way, although according to Soga (1931) fat was rendered and clarified for use on the body. I was told that diviners sometimes use it on their hair. They let their hair grow long, and taking some fat on their hands, take sections of their hair between their palms and rub their hands back and forth so that the hair is twisted into greasy ringlets (*ivitana*). Informants stated that young girls (*iinthombi zamakwenkwe*) sometimes treat their hair in this fashion. Butter is used only by the *abakhwetha* at the end of their seclusion, rubbed over their entire persons after they have finally washed off the white paint. It is made by skimming the cream off the milk, and shaking it in a calabash.

It must not be salted.

Scarification:

The scarification practised by the Xhosa is called *umvambo*. It is popular among the women, and is confined to the torso. The Xhosa women do not tattoo their faces as do the Mpondo and the Mpondomise. The method of scarification was described by an old woman of Bulugha who had herself undergone the process when she was fourteen years old. A man who is skilled in the operation, called *incibi yomvambo*, runs a needle through a portion of the skin, thus raising it, and cuts the skin on both sides of the needle to meet at one point. The wounds are rubbed with a mixture of pork fat and *ichitywa*, which staunches the flow of blood. *Umvambo* is usually practised on the pubescent girls, as a form of decoration; men are not scarified in this way. The pattern favoured by the Xhosa, though admitting of some variation, is in general after this fashion. A double row of markings runs downwards between the breasts from the collarbone to the navel, and under the breasts one or more double rows of markings run at right angles to the perpendicular rows to left and right, or sometimes only to one side. Short diagonal rows running from the perpendicular to the horizontal rows are usual. This design may be elaborated upon, and it sometimes happens that the scarification is continued over the shoulder blades. Lichtenstein (1928), Barrow (1801) and King (1855) state that the arms were included in the treatment, and Lichtenstein avers that men were also "tattoed". Elongated horizontal markings lying parallel one beneath the other, placed between the collarbone and the breasts, are also encountered, although this latter design seems to be practised more by the Mfengu.

The Use of Cosmetics as Status Indicators

It has been noticed that there are occasions when the use of cosmetics is compulsory, sanctioned by tradition which often can vouchsafe no reason for its decrees. The cosmetic which must be used is stipulated, and usually also the manner in which it must be applied. The situations involve ritual conditions when the subject must make an overt show of the social position in which he finds himself. Generally this involves a change in status. Where the use of cosmetics is prescribed, there is usually a compulsory abstinence from the use of any form of display, both as regards clothing and decorative cosmetics. Besides the transition states inherent in a change of status, this is also enjoined on occasions when the subject is considered ritually unclean, i.e. to have the condition of *umlaza*. The girl undergoing initiation into womanhood (*intonjane*), the bride (*umtshakazi*), the nursing mother (*umdlazana*) and her baby, *abakhwetha*, diviners (*amagqira*) and novices and those in mourning (*uzilo*) are subject to certain restrictions where cosmetics are concerned.

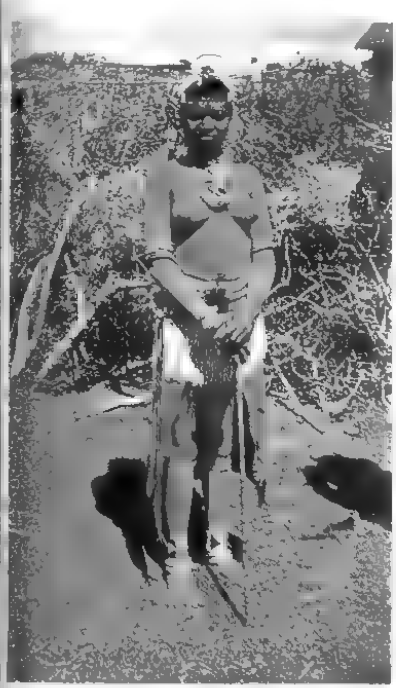
Intonjane:

Girls are prepared for womanhood by a period of seclusion of usually three weeks. This rite is ideally performed when she has her first menses. The girl secluded is called *intonjane*, and she is not allowed to use any body paint during this time. She is covered by an old blanket which must be put right over her head if she has occasion to go outside, and she wears no ornaments, unless they are made of rush. As often as she likes, she washes herself with a decoction of *ungqungu* (Tambookie grass) roots in water. The decoction is supposed to be medicinal. The roots used are sweet-smelling and a strong bleaching agent. During the seclusion of the girl, dances are held, called *umdodo*. There is always a dance of the young girl friends of the *intonjane* (*ingqungqo*). They dress in the seclusion hut, donning short fibre aprons (*iinciyo*) covered with white beads, and all their beadwork finery. Their entire bodies are covered with *ichitywa*, with the exception of their faces. The face is patterned with white paint, although the addition of other colours is permitted. The pattern usually

(*Ph* H. A Atsma)
Married woman painted with *ingxwala.*

(*Ph.* H A Atsma)
Girl with a painted motif on her cheeks.

(*Ph.* H. A. Atsma)
Ingxwala around the eyes of marriageable girl. (*inthombi yabafana.*)



(*Ph.* G. G. Smith)
Dancer at *intonjane* feast, her body covered with *ichitywa.*

(*Ph.* G. G. Smith)
Nursing mother and baby, *ingxwala* on their faces.

(*Ph.* R. Hill)
Girl with *umtoba* painted around her eyes.

takes the form of a spot on each cheek, surrounded by one or more concentric circles of tiny dots. The ears and the areas around them are often painted white, and although there does not appear to be any stipulation as to how the face must be painted, the form adopted is always on these lines. Hunter (1939) and other investigators have shown that this rite is regarded as a preparation for healthy womanhood. Stress is laid nowadays on the fact that the effect of the seclusion is to make her plump and paler-skinned and consequently beautiful. At the end of her seclusion the girl paints herself with *ichitywa* and visits her mother, to indicate that all prohibitions are now removed.

Umtshakazi:

Often the first intimation a girl had that she was to be married was when she was told to paint herself. (Soga 1931.) Lichtenstein (1928) noted that a bride was "in particular . . . new dyed" when making her appearance in public at the cattle kraal, and Thomas Baines in 1848 (Kennedy 1961) noted that for this ceremony she was "annointed with red clay". The bride covers her body with *ichitywa*, excluding her face from this treatment. This is still done in a traditional wedding, although the girl usually knows about the marriage arranged for her and often has chosen her bridegroom herself. The bride is not frivolously dressed in the gay beadwork of her single state, for on marrying she never again dons the beadwork she wore as an unmarried girl (*intombi yabafana*). She is clothed in the long skirt of a wife (preferably the oxhide *isikaka*) and wears traditional ornaments. These usually include a headband of cowrie shells (*ingcaca*), a necklace of animal teeth (*intsimbi yamazinyo*), or a long garland of bead strings (*isidanga*), all of which are kept for formal and important occasions, when as Soga (1931) remarks, clothing of a past age should be worn. This is still considered important. An informant told me that when her brother was married in the King William's Town district four years ago, the girl had to postpone her wedding until she could borrow *ingcaca* and an animal-teeth necklace. The dressed Xhosa imitate the dress of a European bride. When the wedding is over and she starts her career as a wife she wears no special cosmetic to indicate her status, but wears her clothing in a distinguishing style. Her social position is marked by many prohibitions until she has a child. She uses no elaborate facial decoration, as befits her humble position in the *umzi*, for she must show modesty in all she does. When she has had a second child she may adopt a turban and paint her face as elaborately as she chooses.

Umdlezana:

A mother with an infant is in a state of taboo, with many customs to observe in order to ensure the safety of her helpless charge. From the first day after the birth of the baby, it is washed with a decoction of *umthombothi* wood in water. The mother wears a necklace consisting of slivers or sticks of this wood strung on a cow-hair strand, and to make the decoction she breaks a bit off her necklace and grinds it to powder. This is added to the washing water of the baby. Some of the decoction is strained and a teaspoonful given to the infant to drink, daily, so that the umbilical cord may drop off, and to act as a medicine to ensure that the baby's system is in order. At the same time *umthombothi* powder is patted onto the baby like a talcum powder, because of its pleasant scent. The mother will also apply some of the ground wood in water to her face, for the same reason. This procedure continues for the ten-day lying-in period of the mother, which ends when the umbilical cord has dropped off. Her seclusion ended, she makes *ingxwala* into paint. It is usually applied in the form of a mask around her eyes, though this pattern is not essential. Some of the white paint is also smeared on the child's face. She paints her face thus for at least three months, sometimes for two or three years, until the infant is weaned. Another baby must not be conceived until the previous

one is weaned, or the parents are considered to be endangering the life of their child. The white paint appears to indicate the state of taboo in which she is placed, and possibly also has to do with the parlous condition of her helpless infant. In conjunction with the paint the mother wears a necklace either of *umthombothi* or some other wood or root as a charm (*amakhubalo*). I am told that in the old days if an *umdlezana* were to appear at an *umzi* devoid of white paint and *amakubalo* necklace, she would be ridiculed and made to *uyadliwa*, pay some forfeit. The abandoning of the paint seems to be a sign that she and the baby have taken a normal position in their society.

ABAKHWETHA:

After the surgical operation, the boys' faces are smeared with a watery clay or mud found at places along the river banks (*udaka*). The use of this mud is retained until the wounds heal, usually about nine days, and then *ifuta* is prepared. This is the *hlonipha* word for *ingxwala*. The whole body is smeared, and this covering should be kept intact until their seclusion is terminated three to six months later. The *umkhwetha* when roaming the countryside, takes a calabash, or bottle now-a-days, of ready-made paint with him. This liquid *ingxwala* is called *inceke*. He does not impregnate the sheepskin or blanket which he wears with *inceke*. The garments must not, however, be dyed, and a white blanket is chosen. During the seclusion period *umgidi* are held at their fathers' *imizi*, where groups of *abakhwetha* from the neighbourhood compete with each other in the *tshila* dance. For this dance the boys are dressed in the

Abakhwetha going visiting after the circumcision wounds have healed. They are painted with ifuta.

umhlambi outfit made of dried *isundu* palm leaves, and are painted by the young men who underwent the previous *abakhwetha* ceremony. While he is being painted he uses two staves as supports. Xhosa *abakhwetha* are traditionally not elaborately decorated for the *tshila*; they are merely covered from head to foot with *inceke*. The custom in this regard has been considerably modified, probably due to culture contacts where tribal solidarity is in abeyance. In theory, red is strictly taboo to *abakhwetha*. According to informants, blue, an innovation, is not included in this taboo. It is considered to be more like white than red. Beadwork is not worn during initiation; ornaments of rush, seeds or even cloth take their place. Visiting is allowed after the wounds have healed and they have partaken of the *ukojiswa* sacrifice. The abstention taboos are henceforth removed. They visit friends' homes, taking *inceke* and *iblowu*, and paint themselves with blue spots on their whitened bodies. Some paint on moustaches and paint over their eyebrows, with circles or stripes on their foreheads or cheeks as they fancy. The body is also sometimes decorated with bands of spots or stripes, that they may look attractive to the girls. At the conclusion of the seclusion period, the boys run down to the river and wash off the *inceke*. They return to the lodge and a pound of butter is rubbed over each one by a man of substance and high regard. Meanwhile the boys' mothers are busy preparing *ichitywa*. The *rite de passage* having been performed, the boys enter a probation period of a year, during which they are called *amakrwala*. Each boy receives a new blanket rubbed with *umakaba* so that it is not completely red, and covers his body with *ichitywa*. This must be used for a period of three months. It is supposed to restore the skin to a healthy condition after the prolonged use of *ingxwala*. Their treatment is not yet complete. Having abandoned the compulsory use of *ichitywa*, they then must make the yellow *isibindi* cosmetic. They must apply it to their faces every day for a time, generally only for a few days, after which the observances concomitant with initiation are at an end, and toward the end of December they buy new blankets to be dyed with *imbola* in the regular way. They then leave home to work, preferably in the mines, and are considered *amakrwala* until they return the following June; i.e. until the reappearance of the *isilimela* (the pleiades) in the morning skies. Thereafter they are called *abafana*; they don their red blankets (or a new suit of clothing) and are given beadwork by their sweethearts, who have been busy making it while they were away.

Amagqira:

A person whose sickness has been diagnosed by an *isanuse* (specialist diviner) as an indication that he or she should become an *igqira*, wears undyed, white clothes. Red ochred clothes and ordinary facial paint are prohibited. The novice, who henceforth lives with the *isanuse* and is initiated into the secrets of the profession, is only allowed to use *ingxwala*. The period of training usually lasts about a year, after which a ceremony is observed to indicate publicly that the novice is now able to conduct the business of an *igqira*. At this ritual a beast is sacrificed and the novice is daubed with *ingxwala* on face and body, usually in the form of spots, and thus painted the novice is supposed to resemble a wild animal which is a manifestation of the ancestor spirit that appears in this form in the novice's dreams, where it directs him in the course he is to take. The gall bladder is brought, and the gall poured onto the joints of the novice. The gall bladder is to be worn by the novice, often around the neck, fixed to a necklace of white beads. The members of the novice's *umzi* provide the beads which are made into bands for the neck, wrists, ankles and head. As an *igqira*, the person, male or female, may only wear white, other dyes and paints are prohibited. The *amagqira* sometimes paint their faces with *ingxwala*, at least at their dances (*iintlombe*), when full regalia is donned. Such was the case at an *intlombe* held for an initiate in the Gulu district. The initiate himself had his face painted around his eyes and on his cheeks, extending over his ears, and his whole body was blotched with dabs of *inceke*.

Uzilo:

When a person dies, the women of the *umzi* set up a loud wailing and no-one goes near the corpse except those who are responsible for the grave digging and burial, as contact with a corpse conveys *umlaza*. The burial party strip off clothing and ornaments, otherwise these would have to be destroyed as being contaminated. When the grave has been filled in, they and the rest of those present at the *umzi* and near relatives go to a river to wash away the pollution of death, and their heads are shaved in mourning. The widow or widower, and the mother if it is a child which has died, threads a couple of straws (*uluzi*) around the neck and wears no other ornaments. For a time after the death the relatives abstain from visiting, and the *umzi* is not visited. This seclusion lasts for about a month, in some cases two months, after which beer is brewed at the *umzi* and drunk by the relatives. The widow or widower is given new clothing. These blankets must not be dyed, as a sign of mourning, and the white clothing is worn for a year. During this period *imbola* must not be worn on the body either. Dressed Xhosa wear black clothing.

Personal Predilections:

These form those conditions under which some form of compulsion with regard to the use of cosmetics is encountered. When there is no such custom involved, there is no restriction as to which type is to be worn. The age of the person does not determine which cosmetic shall be worn, and although the men do not as a rule make as much use of cosmetics as the women, sex is not a determinant either. The patterns achieved with cosmetics are not exclusive to any one age group. However, the mask-like design around the eyes seems to be a pattern especially appropriate to the young matrons, while the elaborate motifs painted on the cheeks are most popular among the unmarried girls. Older women do not generally employ their facial cosmetics in patterning, and among children a smear of paint is usually enough decoration. But from the youngest to the oldest, male and female, any of the cosmetics mentioned may be used in any pattern that takes their fancy. Some of these will be described, to show the type of appearance considered beautiful.

A. Small white patterns on each cheek; a spot surrounded by one or more concentric circles of tiny dots; four spots on each cheek in a diamond-shape formation, or a circle with a cross in the centre; a motif like the five in a set of dominoes.
B. The whole face is covered with red *ichitywa* or brown or yellow *isibindi*. In addition, there may be a spot of white on each cheek and a blue spot on the forehead and chin.
C. A white spot on each cheek, with an alternative addition of a white spot on the forehead.
D. White covering of the face up to the eyebrows, including the eye regions or excluding them.
E. Red or yellow ochre around the eye regions.
F. A covering of white all over the face, or daubs of white paint on any part of the face.
G. White paint over the ears, sometimes also around the neck and over the chin.
H. A facial covering of yellow ochre powder.

The Symbolism of Paint:

It will be seen that these fanciful designs in many cases correspond to the designs used in ritual make-up. It is difficult to draw a line between normal and ritual uses of paint. For example, while the *intonjane* dancers habitually paint white designs on their cheeks, is this ritual make-up or is it merely used to look decorative? The Xhosa women incline to the latter view, but one feels that a tradition in this case has been established, for the other types of decorating the face are not met with for this dance. These elaborate designs are met with at feasts, usually worn by the married women, the colours tastefully chosen to match their robes and brightly-coloured scarves (*ifokwane*) which they combine in fanciful and elaborate

ways with their dark-coloured turbans. It is usually the *amadikazi*, a class of women which includes widows, wives deserted by their husbands and unmarried mothers, who wear the most flamboyant clothing and paint. Although the cosmetics of the Xhosa cannot be strictly divided into ritual and non-ritual categories, there is nevertheless broadly speaking these two classes where colouring matter is concerned. White is considered the colour for use when religion is involved, while the reds, including the yellows, are regarded as the colours for festivities and normal social life.

Red is the colour beloved of the Xhosa. It expresses their vanity and show of good spirits. Red is used on the faces and clothes of those who are normal and ritually sound; the significance of red lies in its normality. When its use is suspended, something abnormal and supernatural is involved. People resuming their normal life in the tribe after a period of seclusion, such as the *abakhwetha* and the *intonjane*, by resuming the use of red on body and clothes, indicate that they have passed the testing time and are back to normal. In respect to its use among the Xhosa, white is the opposite of red.

The wearing of white paint seems to be a sign of exclusion from normal social life, and as such would be an effective warning to persons not acquainted with the subject's condition.

Thus the nursing mother is taboo to men lest her infant be harmed by another pregnancy. *Abakhwetha* are secluded as contact with ritual uncleanness (*umlaza*) would prevent their circumcision wounds healing properly. Novices are also in danger from *umlaza*, as they are people made ill by the ancestor spirits (*iminyanya*), and they would not get well.

White paint also seems to indicate contact with the ancestor spirits, and appears to be closely related to religion. Diviners wear white clothing and paint, at least at their *iintlombi* (seances) and the reason given me by a diviner was that thus she would be recognised by the "people of the river", called *izilo*. "Every now and then we visit them in the river, and come out with white paint on our faces."

White clothing is worn when a gay appearance is not fitting, and the subject must abstain from ornamentation. An informant stated that mourners wear white because people must see that something unfortunate has happened to them, and that they are grieved.

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Scott's Cave: A Late Stone Age site in the Gamtoos Valley

Introduction

A number of sites in the Albany District and other parts of the Eastern Cape region, excavated over the period 1920–1939 have yielded well-preserved organic remains associated with Late Stone Age cultural material. In Southern Africa it is probably only in the drier parts of South West Africa that comparably well preserved sites may be found. In the Eastern Cape, preservation of the more perishable material in such cave sites can be attributed partly to the pattern of the Late Stone Age occupation persisting until relatively recent times without the disrupting effects of the influx of the Iron Age and European peoples, and partly to the dryness of the shelters or caves in the quartzite of the Cape System or the boulder beds of the Enon Conglomerate, and the lack of any marked wet and dry seasonal climatic oscillations. The region is thus an important one for the study of the Late Stone Age and, in spite of the relative modernity of some sites, the evidence they afford through the well-preserved material remains will reflect the traditional way of life and material culture of the Late Stone Age populations.

The better known of these sites include Melkhoutboom (Hewitt 1931), Spitzkop and Wilton (Hewitt 1921). Melkhoutboom yielded a series of bedding layers, the remains of a number of edible plant foods, a series of wooden implements, worked leather, string, and a number of stone artefacts with mastic adhering. From the Wilton type collection in the Albany Museum, again a number of artefacts with mastic adhering have been noted. There is less recorded information on the excavation at the Spitzkop caves, but string, wooden implements (including a fire stick), and a large piece of dressed and sewn leather, possibly a portion of a kaross, were recovered. Bone, vegetable foods and fresh water mussel shells found in each of these sites point to an economy based on hunting and collecting.

Scott's Cave (25° 43′ E., 33° 44′ S.), on the farm Scothurst (Erfpacht, Uit. Q. 3.75), six miles north of Patensie in the Gamtoos Valley was excavated in part in August, 1963. The excavation was undertaken as there was, and still is, a possibility of the site being destroyed by re-alignment of the road from Patensie to the new Koega Dam. Preliminary examination of the cave has shown a mound of well-preserved vegetation—a bedding accumulation—exposed in an eroded area of the floor. Subsequent roof falls had sealed the bedding layer from the present-day surface. Ash, shell, pottery, stone and wooden implements were included in the bedding layer and the potential archaeological value of

Ann. Cape Prov. Mus. III. 1963. South Africa.

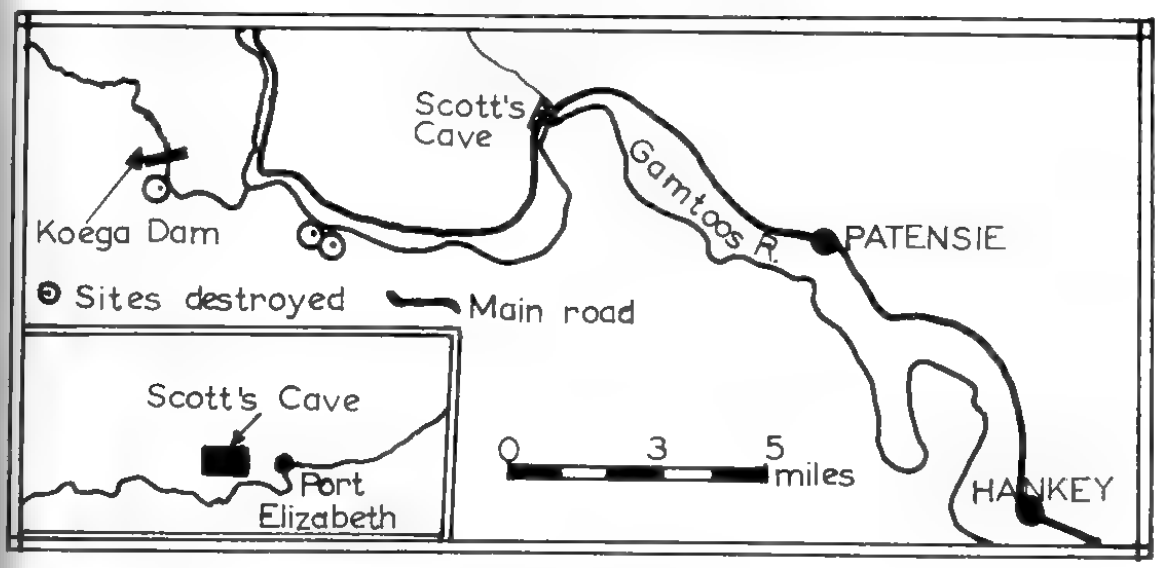


Fig. 1. Scott's Cave: Locality map.

the site was such as to warrant some form of rescue excavation. The results of the excavation are outlined in this paper.

The value of the Scott's Cave site, as with, for example, Melkhoutboom, lies in the good state of preservation of the non-lithic remains. Only a small part of the cave floor has been excavated and it is hoped that the results from this work will show the necessity of preserving the site for future further investigation. In the construction programme for the new dam and irrigation scheme in the valley, it has unfortunately already been necessary to destroy three cave sites over the last two years. It is to the credit of Mr. W. J. R. Alexander, Resident Engineer of the Gamtoos Canals, that some of the cultural material and the skeletal remains from these sites was recovered. Such recovery, however, cannot replace controlled excavation.

The Site

The cave has been cut into a spur of Enon Conglomerate (Cretaceous) in a tributary valley of the Gamtoos River. The tributary stream has been diverted in recent times and its old flood plain below the entrance to the cave is now a citrus orchard. The vertical upstream face of the spur and the undercut or cave beneath were formed by the action of this stream in earlier geological times. Roof collapse in the cave had subsequently raised the floor of the fore portion above the flood plain of the stream, checking its erosive action and making the cave habitable. In the rear of the cave, a major collapse has taken place and this is marked by a subsidence crater on the surface. Prior to this collapse the area of the cave was probably twice that shown in the plan (Fig. 2). This main subsidence in the rear of the cave may date prior to the Late Stone Age occupation, but older inhabitants of the valley recollect at least further subsidence some 50 years ago. Roof collapse in the cave is a process continuing up to the present as shown by the layer of roof blocks forming a seal, one to two feet thick, over the layer of Late Stone Age occupational debris. No major falls have been recorded over the last twenty years.

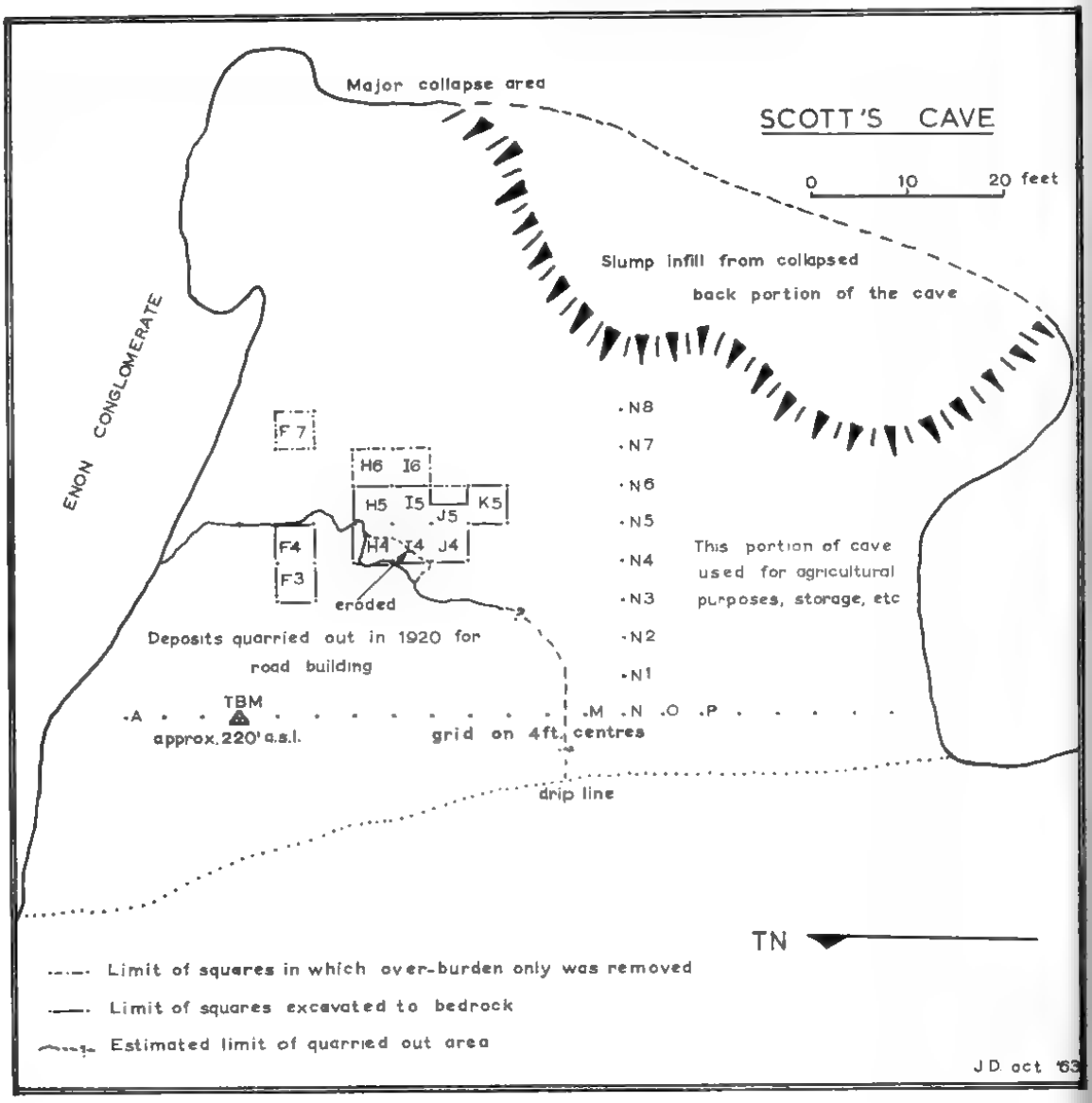


Fig. 2. Scott's Cave: Plan.

In 1920 a portion of the deposit from the front of the cave was quarried out for road metal (Fig. 2). Apart from the sinking of a series of post holes into the floor of the cave to support a tobacco-drying framework, and its continued use as an agricultural store room, the deposit has not suffered further depredation.

The Late Stone Age cultural layer can be regarded as a single unit in the excavated area between Squares G5 and K5 (Fig. 3), varying from a few inches to two feet in thickness and

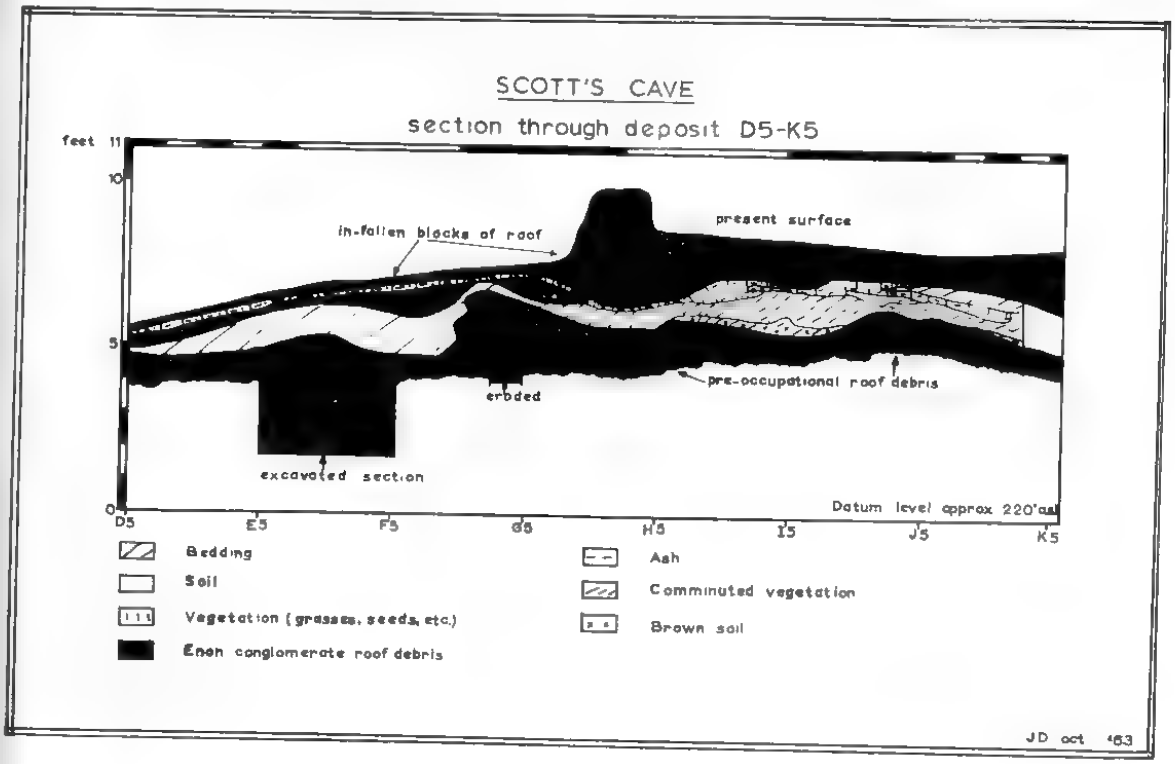


Fig. 3. Scott's Cave: Section.

lying on an uneven floor of pre-occupational roof blocks. From the eroded edge of the quarried-out area, it has been possible to draw the section between D5 and G5 in addition to that of the excavated section.

The cultural horizon is composed of a succession of deposits comprising soil, ash and organic material, while stone, wood and bone artefacts, beads and pottery occur throughout the occupation deposit and all appear to belong to a single cultural phase.

The occupation deposit is thought to have accumulated relatively rapidly because of the organic material, including twigs, branches, grass, etc., brought into the cave, and the accumulation of ash and other debris. In the lower spits the organic material is partially oxidised, but the leaves, stems and seeds are still identifiable. The preservation of the organic material in the upper spits is excellent.

Excavation

A base line was laid out across the mouth of the cave and the surface gridded on 4-foot centres (Fig. 2). In order to establish the thickness of the deposit and whether or not it was underlain by an earlier occupation horizon, a small cutting on grid Squares F3 and F4 was made. The results were negative and it seems probable that no earlier occupations exists in this portion of the cave. The top spits in these squares included derived cultural material from the eroded edge of the area quarried out, and although derived, this material is included in the tables given in the text but has no quantitative significance.

Fig. 4. Scott's Cave: The excavation, the ranging rods are marked in feet

The main excavation was restricted to Squares H4–5, 14–5, J4–5 and K5, with the object in view of exposing a bedding mound. The overburden of roof blocks was removed from this area and from Squares F5, H6 and 16, although the latter were not excavated to bedrock. The cultural horizon was excavated in 3-inch spits and the material screened through 2 and 5 mesh screens. The grid and a level were used to control the plotting of small finds. As cultural material was scattered throughout—even in the bedding—it was not possible to isolate any single occupation floor in the deposit.

Cultural Material

A. Lithic Industry

The table below represents the complete sample of the lithic material recovered during the excavation.

Square	F3/F4	K5	J4	J5	14	15	H4	H5	Total
Utilized flakes	26	23	24	38	21	35	35	10	212
Waste flakes	16	208	487	191	437	236	315	157	2147
Cores	3	7	15	9	14	12	4	10	74
Utilized cores	5	1	1	1	—	3	2	1	14
Chips and chunks	2	83	16	27	102	44	90	20	284
Pebble tools	—	2	1	1	—	2	—	1	7
Modified pieces	—	—	—	—	1	2	2	—	5
Palettes	—	—	—	—	—	—	—	1	1
Rubbers	—	—	—	—	—	—	—	1	1
Ochre	—	14	2	3	16	13	6	9	63
							Grand Total ..		2808

Quartzite has been used almost exclusively as the raw material, the Enon Conglomerate boulders and pebbles providing an abundant local source. No formal tool types were found in the excavated sample and there is little or no secondary trimming making it difficult to distinguish between utilized and un-utilized pieces. The industry is characterized by a large number of thick, short flakes produced by direct percussion flaking. Many of the flakes, both utilized and waste, show cortex of the original pebble retained on surfaces other than the bulbar end. The sample of the lithic industry is relatively small (2,808 pieces) and was excavated from a localized area of the cave and may therefore not be fully representative of the occupational phase.

Utilized and Waste Flakes

There is no variation in the size, as expressed in the Length/Breadth ratio diagrams, between either the waste and utilized flakes or between flakes from different spit levels or different squares. In Fig. 5 A, the Length/Breadth ratios of the waste and utilized flakes from the three lower spits of Square K5 fall within the same limits and the pattern is very similar to that for the top spit of Square 15 as shown in Fig. 5B. There is a considerable range in size from 1 x 1 cm. to 7 x 7 cm. for both utilized and waste flakes, and few have a length greater than twice the breadth that could be classified as flake blades.

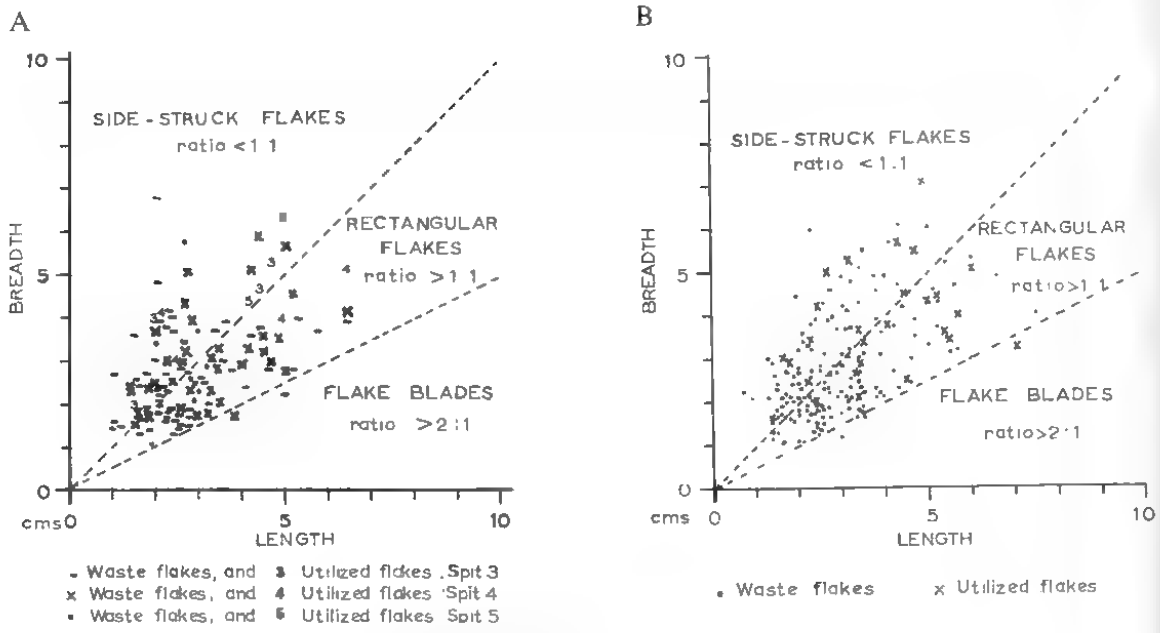


Fig. 5. Scott's Cave. A—Length Breadth analysis of 105 waste flakes and 10 utilized flakes from the lower spits in Square K5. B—Length/Breadth analysis of 151 waste flakes and 27 utilized flakes from the upper spit in Square J5.

Few of the utilized flakes show any secondary working. Of a sample of 28 utilized flakes from Square J5, only 28 % did not retain any cortex of the original pebble from which they were struck. Some 28 % retained cortex on the platform only, while 44 % retained cortex on surfaces other than the platform. This demonstrated that there was no attempt at the preparation of the core to produce flakes of a definite shape.

The paucity of pieces with secondary retouch, and the difficulty of determining damage due to utilization on these quartzite flakes is probably reflected as a sorting error in the high proportion of waste flakes to utilized flakes in all samples. In a sample of 209 waste flakes from Square J5, 76 % of the flakes have more than a quarter of the perimeter potentially useful as a cutting edge. It can be safely assumed that a proportion of these flakes, classified as waste, were indeed used on soft materials. Working of even soft materials would soon cause a flake to lose its initial sharpness, with negligible visible damage to the edge. The grain of the quartzite precludes the certain recognition of such damage even under a microscope.

Cores

Few cores were recovered in the sample, and of the total of 88, only 14 show utilization as core tools. The cores are irregular in form and are not apparently typologically diagnostic.

Chips and Chunks

This is the second largest category after waste flakes. In part, the chunks may include some core residues, but heat spalling which is not easily distinguishable from percussion flake scars in a broken fragment of quartzite, has undoubtedly increased the numbers of pieces classified as chips and chunks.

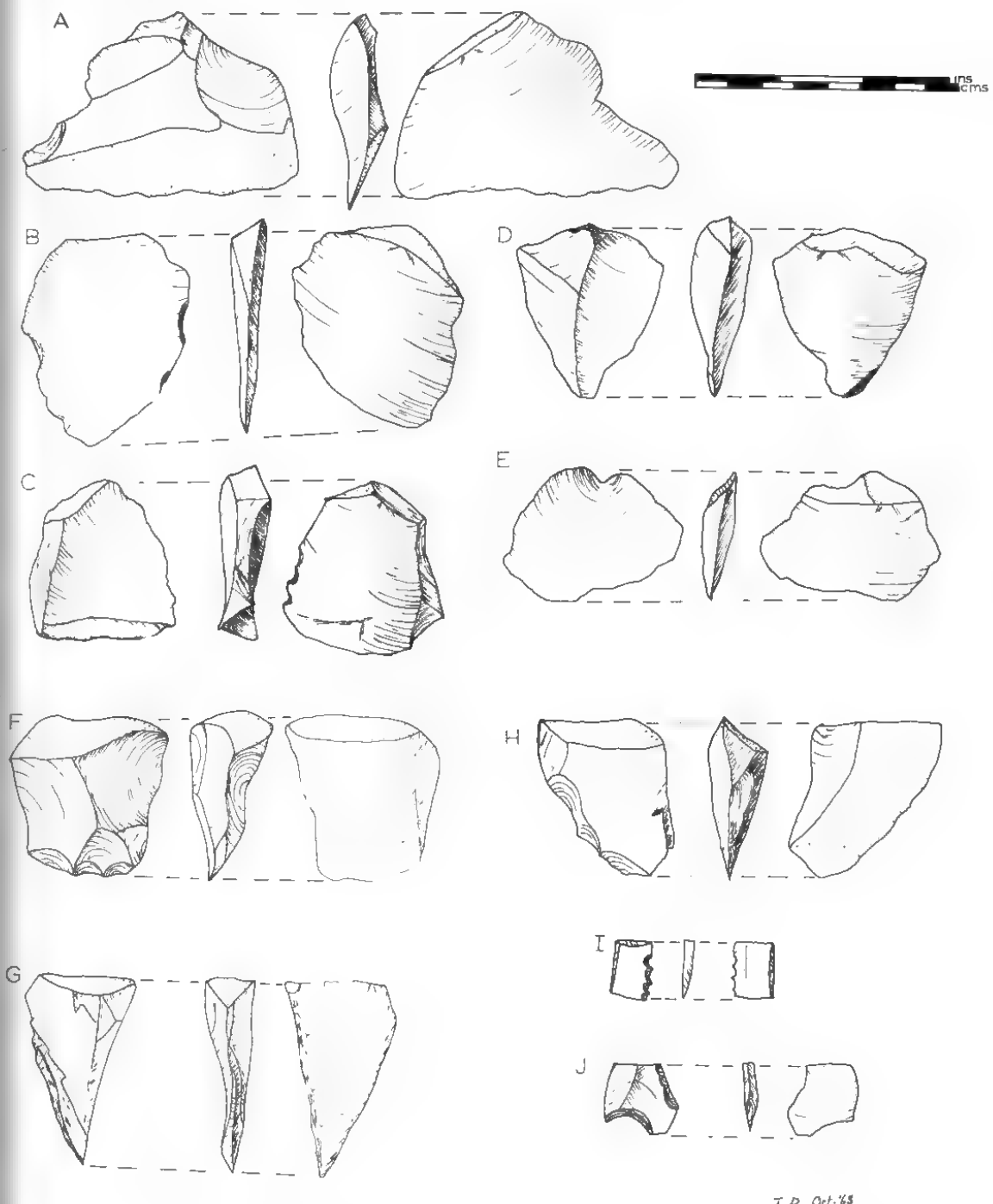


Fig. 6. Scott's Cave: A, B, C, F, G, H, I, J—Utilized flakes; D and E—Waste flakes; A E—Square H4, spit 1; F–G—Square I5, spit 1; H–J—J4, spit 2.

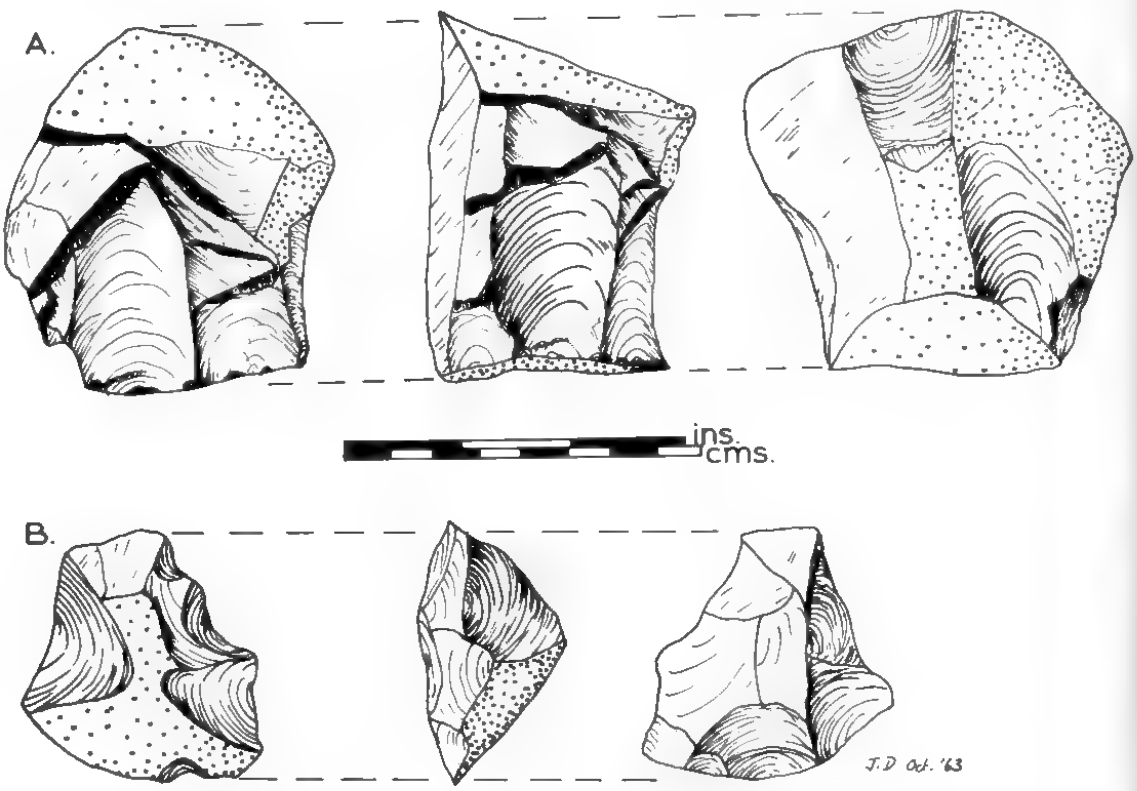


Fig. 7. Scott's Cave: A—Core from Square H5, spit 2; B—Core from Square K5, spit 4.

Pebble Tools

These include simple forms flaked in one or two directions to produce an irregular cutting edge, and one example of a high-backed tool, steeply trimmed with a scraper-like edge. (Fig. 8 A).

Modified Pieces

There are five examples in this category and they represent natural pieces which have been modified by use.

Palettes

A single broken palette, recovered from Square H5, is 4 cm. wide and has a maximum thickness of 2 mm. The end is square and all the edges are ground. The central area of the one surface shows a smooth polish, while elsewhere on this surface and on the reverse side there are numerous fine scratches. The scratch marks run longitudinally in the main, with some transverse marks at the square end. These scratch marks may relate to the manufacture rather than the use of the tool. There is no pigment staining on the palette which is made of a shaly material.

Rubbers

One rubber is represented in the sample, from Square H5. It is a water rounded pebble on which one surface shows artificial smoothing.

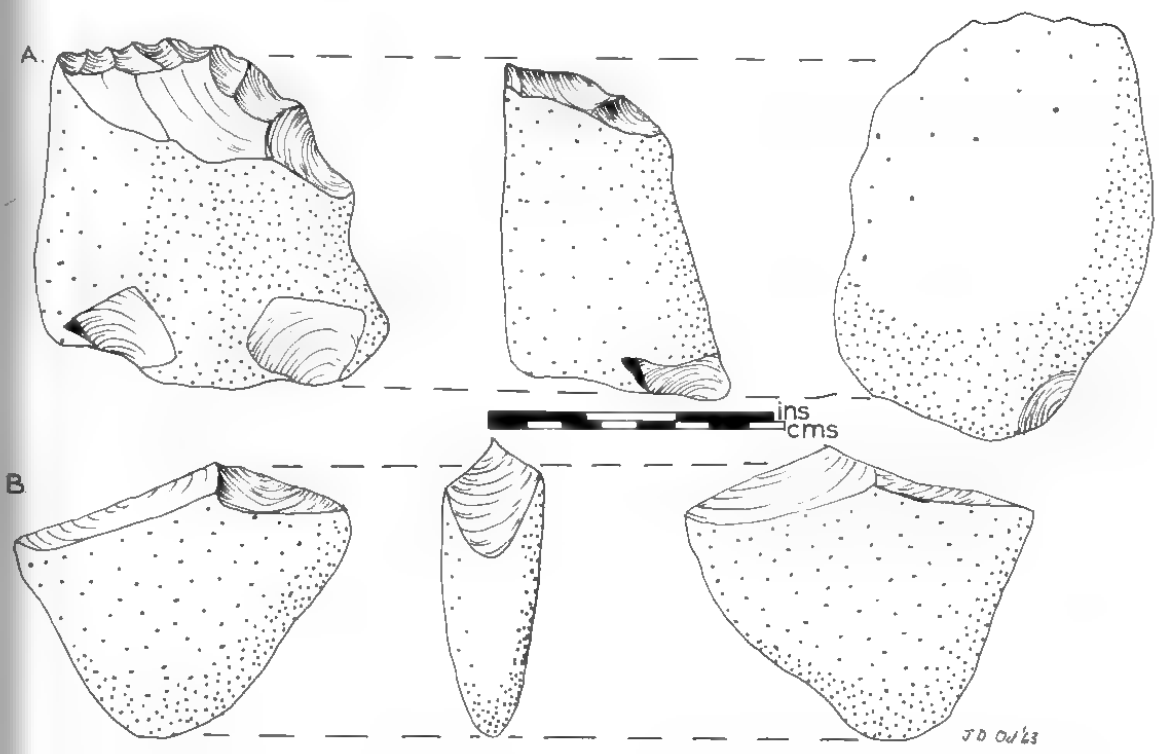


Fig. 8. Scott's Cave: A—Pebble tool from Square I5, spit 1; B—Pebble tool from Square K5, spit 3.

Ochre

Numerous fragments of ochre are present. These vary from small chips to a piece in the form of a slab 7·5 cm. long by 6 cm. wide and 0·5 cm. thick, and with one edge artificially rounded.

B. Non-Lithic Material

Beads

Apart from a single pottery bead (described later), ostrich eggshell and two types of shell beads were recovered. These are illustrated in Fig. 9. The sample of beads is too small for metric analysis. From J5, spit 1, six beads, all broken and unfinished, were found. Fragments of ostrich eggshell occur throughout the deposit. The distribution of beads in the excavated area is detailed below.

Square	F3	F4	K5	J4	J5	I4	I5	H4	H5	Total
Ostrich eggshell	—		8	11	6	2	1	2	·	30
Marine shell	—		—	—	·	11	3	—	1	15

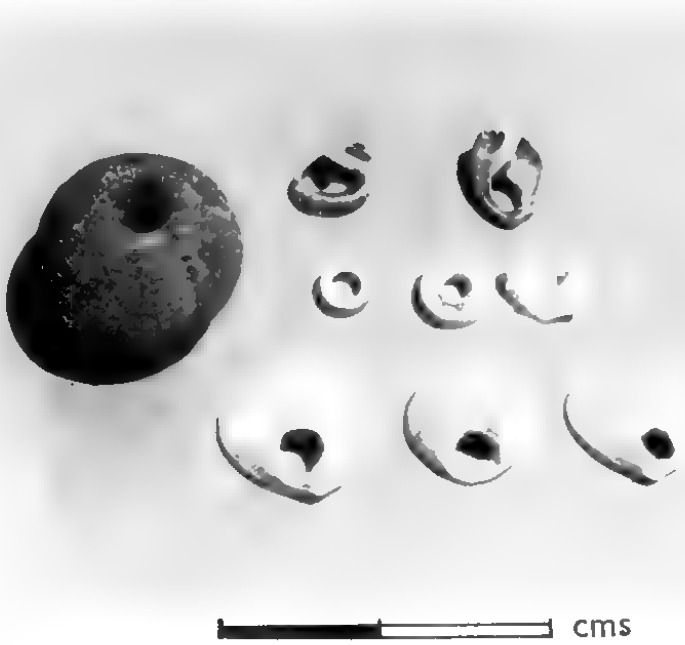


Fig. 9. Scott's Cave: Pottery, shell and ostrich eggshell beads.

Leather

Skin or leather is seldom preserved in archaeological contexts in South African sites, and thus the fragments of leather from Scott's Cave are of some interest. All the fragments found occurred associated with the bedding in Square K5. These include one piece 24 cm. by 10 cm., possibly part of a garment. On one side a small piece has been sewn onto it by over-stitching of the two pieces which have been placed right-side on right-side (Fig. 10 D). Sinew has been used as the thread. The second leather piece is a knotted thong only 3 cm. long made from leather 2 mm. thick and 3 mm. wide. There are also two small fragments of thin leather of no form which have been partially destroyed by the action of some animal. The fifth piece consists of two knotted lengths which were joined to a third piece as seen by the knot at one end. The total length is 24 cm., the width 1 cm. and the thickness 1 mm. The two pieces have been knotted by making a slit near the end of each piece and using the nooses so formed to loop one piece through the other. (Fig. 10 E).

String

Square	..	..	F3	F4	K5	J4	J5	14	15	H4	H5	Total
Pieces of String	..	..	–		4	3	1		1	·	2	11

All the lengths of string recovered are under 35 cm. long and range in thickness from 2 to 5 mm. Three examples are illustrated in Fig. 10. It is made from twisted vegetable fibre from a plant which has not yet been identified. One length (Fig. 10 B) consists of a core of fibres which have been bound by a single twisted strand and may have been used as a decora-

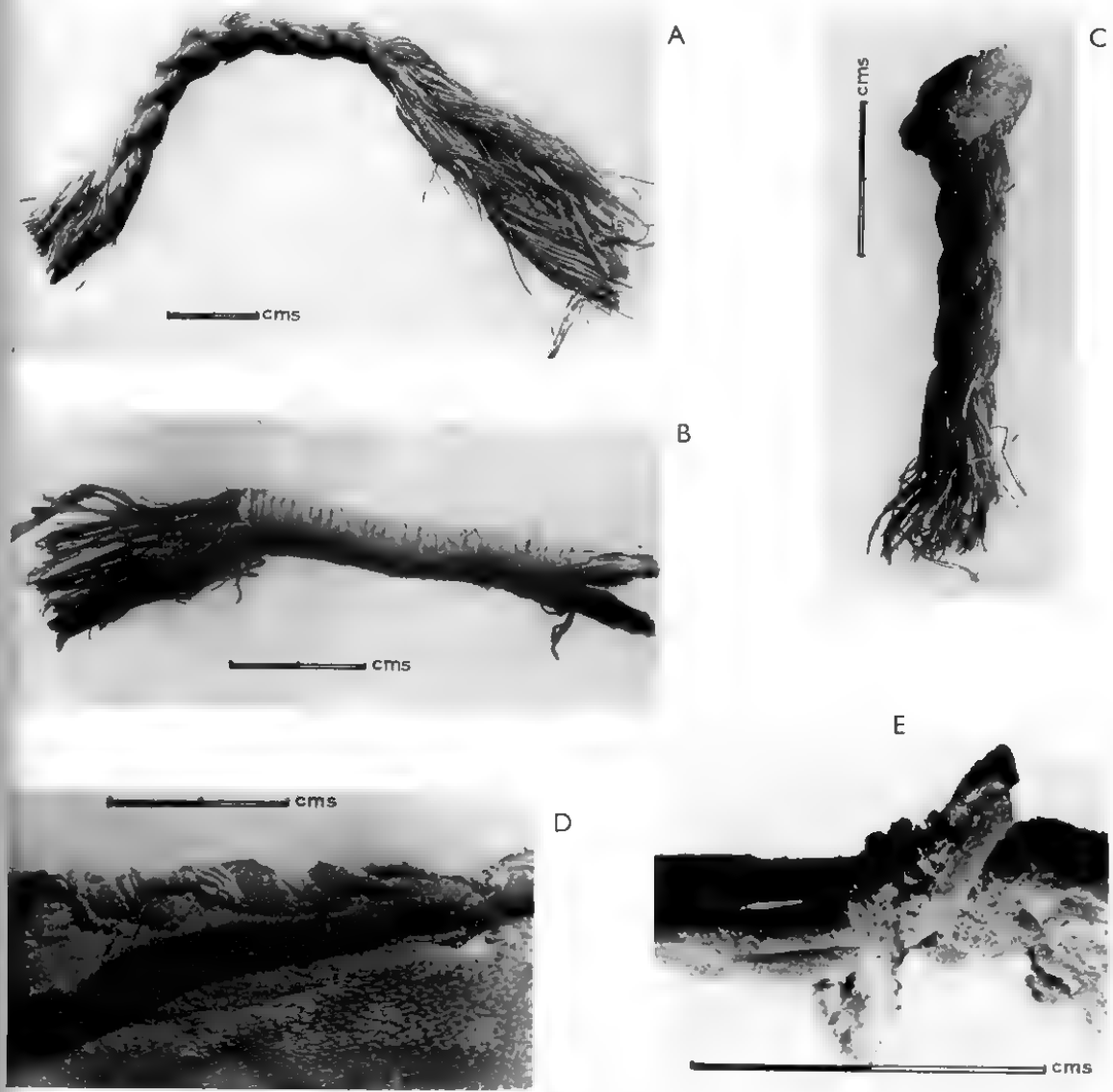


Fig. 10. Scott's Cave: A Length of string made from twisted fibres; B—Bound fibres, possibly ornamental; C—Knotted string; D –Sewn leather; E—The interlooped ends of two short lengths of leather thong.

tive tassel rather than as a functional piece of string. All the other lengths are made of twisted strands, each strand composed of a number of fibres. One length (Fig. 10 C) has been knotted with a simple knot. The string from this site is similar to that from the Melkhoutboom and Spitzkop sites, and that illustrated by Grobbelaar and Goodwin (1952) from the Windhoek Cave near Bredasdorp.

Pottery

Square	F3/F4	K5	J4	J5	14	15	H4	H5	Total
Total sherds	158	174	226	190	362	143	261	157	1671
Decorated and rim sherds ..	3	9	11	4	8	9	13	7	64
Lugs and Bosses	2	—	1	—	—	2	—	1	6

The pottery sherds occur throughout the deposit and at all spit levels. There are few large sherds and only one rim was sufficiently complete to allow the reconstruction of the original form of the pot. Some 36 bowls or pots are represented by a total of 40 rim sherds.

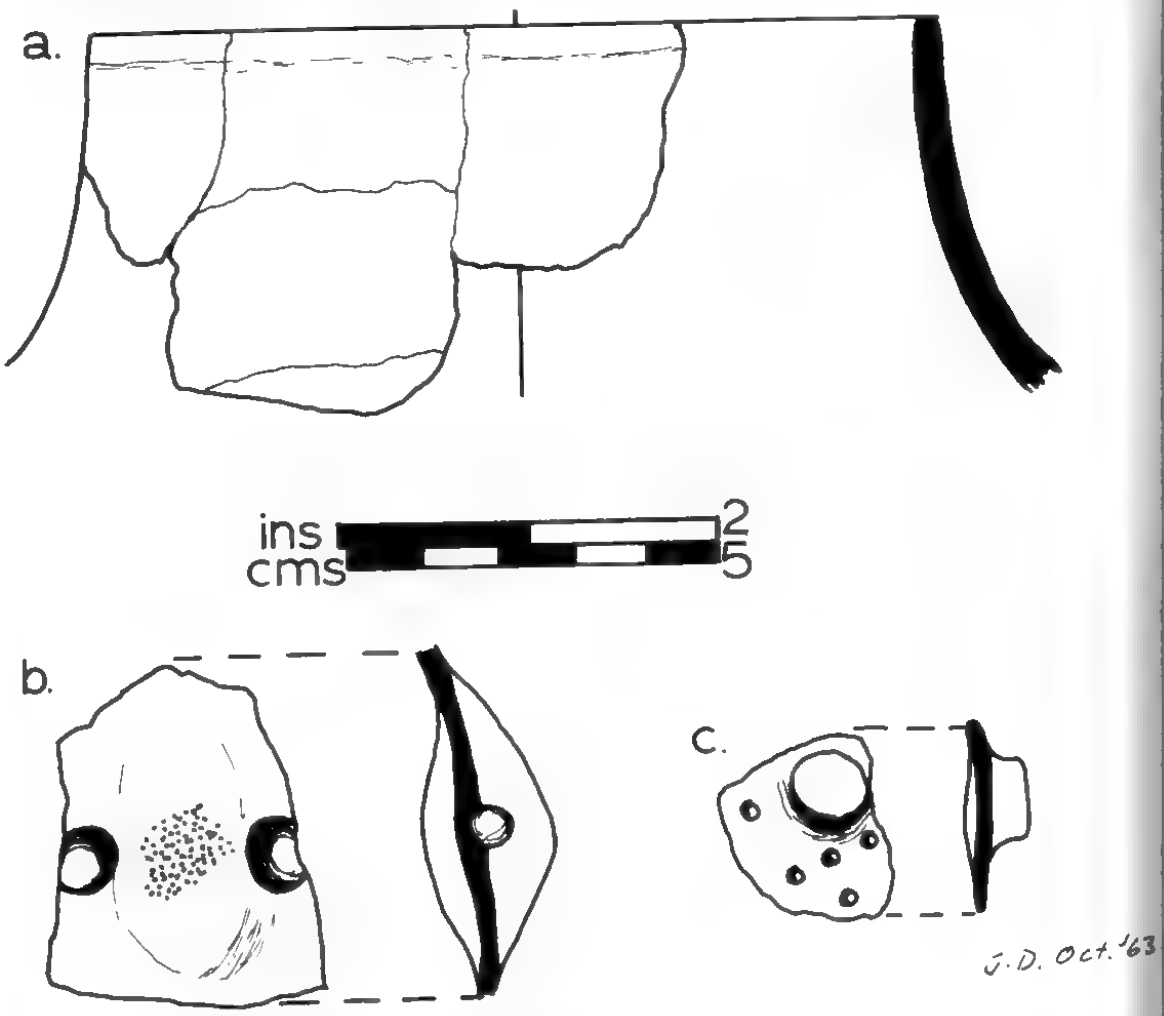


Fig. 11. Scott's Cave: Pottery. a—Largest rim sherd showing size and shape of the neck of the pot; b—Internally reinforced lug showing surface damage on the crest; c—Internally reinforced boss with dot impression decoration.

The reconstructable sherds form a shouldered pot with a rim diameter 11·5 cm. (4½ ins.) (Fig. 11 A). The occurrence of a number of shoulder sherds in the deposit indicates that this form is fairly common, while some of the simpler rim sherds may belong to bowls.

The pottery is well fired and the quartz temper that has been used throughout is coarse and angular with the larger grains measuring up to 4 mm. in length. The thickness of the sherds varies from 2 to 6 mm. This variation is not restricted to different pots, as on one sherd of a shouldered pot the rim is 2·5 mm. thick and the shoulder portion is 5 mm. thick. The colour is of varying shades between red and buff with black sherds also represented. The variation in colour between red and black on individual sherds makes any distinction in the pottery on the basis of colour of doubtful value. The external surface of the sherds shows smoothing and the finish is good. Artificial colouring appears to have been used in the finish of some both red and black pots.

The rims include plain, rolled, bevelled and everted forms and are illustrated in Fig. 12. The decoration is limited to only 2·5% of the total sherds and these are almost entirely rim or shoulder sherds. The motifs include horizontal and diagonal grooved lines, horizontal incised lines, and oval and dot impressions (Fig. 13 A and B).

Three internally re-inforced lugs were found (Fig. 11 B) and a single sherd is pierced by a hole drilled after firing. In addition, three small "bosses" (Fig. 11 C), which are internally re-inforced, were found; two are ringed by an impressed dot motif, the third is not decorated.

One round pottery bead (Fig. 9) was recovered from Square H4. It is black in colour with quartz temper clearly visible in the rough surface. The bead was fired in its present form and is not a drilled pottery pellet.

Bone Implements

Two bone points or bodkins, one made of a hollow bone and the other from a bone sliver, were excavated from different spits in Square I 5 (Fig. 14, A B). A bone tube, 5·2 cm. long with an internal diameter of 0·5 cm. was recovered from spit 2 in Square J5. The ends of the tube have been artificially rounded, and it is complete in its present form although it may have formed part of a composite object. Discolouration of the one end of the tube appears to support the suggestion that it was used as a pipe (Fig. 14, C).

The sample of faunal remains in the excavated assemblage is very fragmented. The fragmentation is greater than would be expected from the splitting of the bones to extract the marrow and there is the probability that a number of fragments were utilized as tools. Some of the fragments show bruising (Fig. 14, D) and others cut marks. Several bone flakes (Fig. 15, E F) struck by percussion were noted and there are two fragments which show flaking along the edge (Fig. 15, D and G).

Wooden Implements

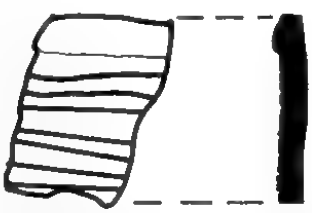
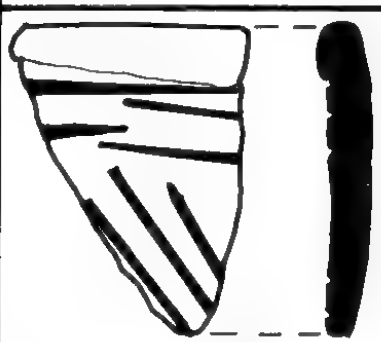
Square	F3, F4	K5	J4	J5	14	15	H4	H5	Total
Wooden pegs	—	2	1	1		-	—	—	4
Fire sticks	-	—	—	—	—	3	—	—	3
Other wooden objects ..	3	4	2	—	—	3	—	4	16

Some twenty-three implements of wood were recovered from the deposit, apart from a number of twigs or branches showing cut marks, and several wooden parings or slivers. It is not possible to classify all the wooden implements according to function as included in the total are some which are probably not formal tools, but were made for a specific task,

DESCRIPTION	RIM SECTION	No. OF SHERDS	% OF TOTAL RIM SHERDS
i. Plain rounded		9	22.5 %
ii. Plain squared		10	25 %
iii. Rolled edge, rounded		10	25 %
iv. Rolled edge, squared		4	10 %
v. Bevelled outwards		2	5 %
vi. Everted		5	12·5%
TOTAL RIM SHERDS		40	100 %

Fig. 12. Scott's Cave: Analysis of rim potsherds.

A. DECORATED RIM SHERDS

DESCRIPTION	DECORATION	No. of SHERDS	% OF TOTAL DECORATED
i Rim junction slightly emphasized		9	30 %
ii. Horizontal grooves		2	7 %
iii. Horizontal incised lines		2	7 %
iv. Horizontal and diagonal grooves		1	3 %
v. Impressed dots		1	3 %

B. OTHER DECORATED SHERDS

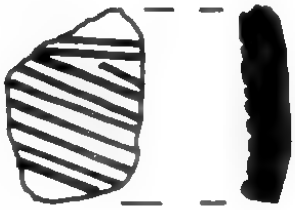
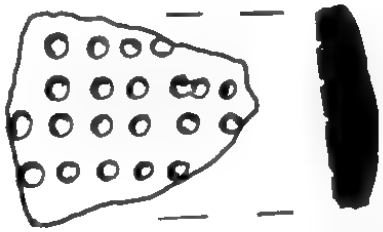
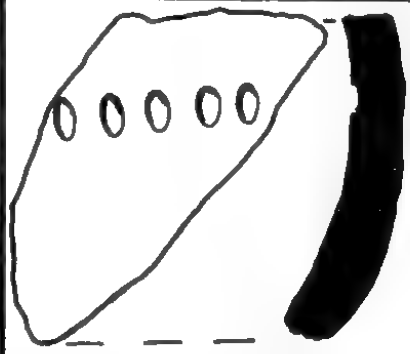
DESCRIPTION	DECORATION	No. of SHERDS	% of TOTAL DECORATED
i. Horizontal grooves		7	23%
ii. Horizontal and diagonal grooves		2	7%
iii. Impressed dots		5	17%
iv. Oval impressions		1	3%
GRAND TOTAL DECORATED SHERDS		30	100%

Fig. 13. Scott's Cave: Analysis of decorated potsherds.

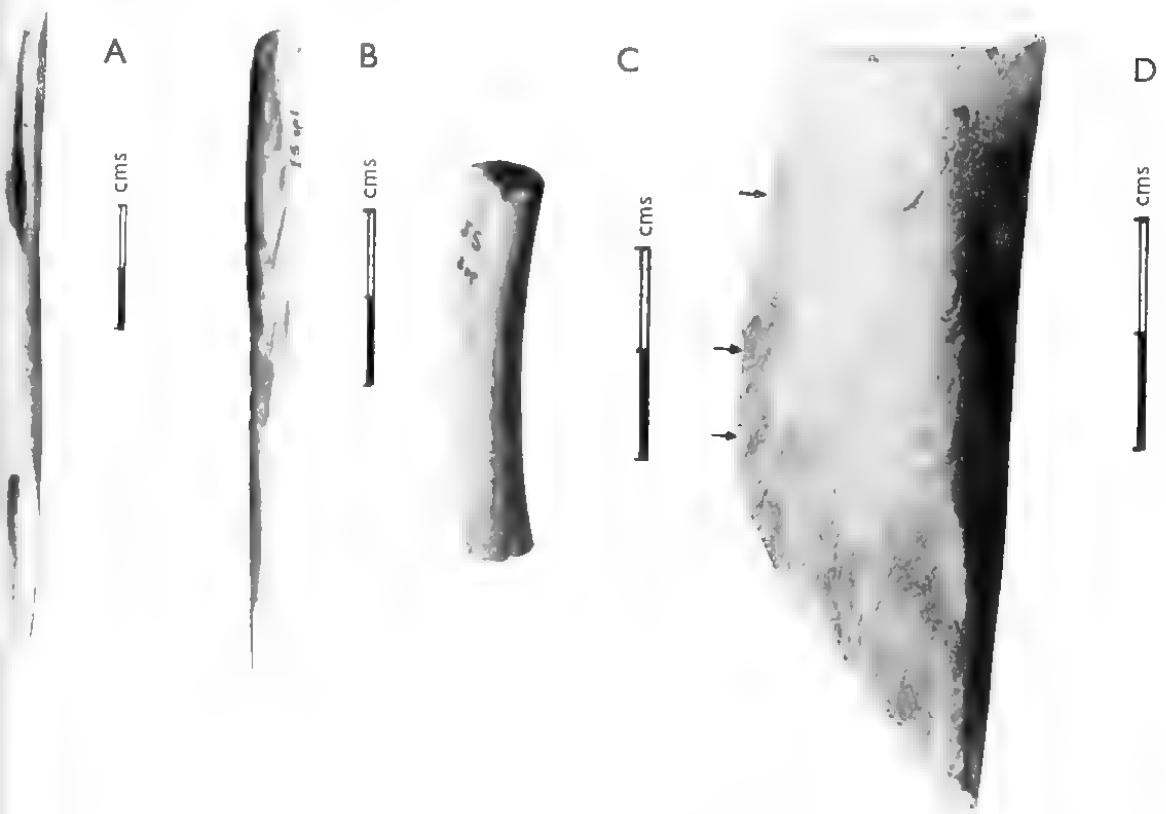


Fig. 14. Scott's Cave: Bone implements and utilized bone; the arrows in D indicate bruising. A and B—awls or points; C—possible smoking pipe; D—Utilized bone fragment.

while others are broken or incomplete. Among the tools can be listed: a portion of a bow stave, wooden points, a linkshaft, a flat, pointed tool, and a possible projectile point, in addition to the pegs and fire sticks tabled above.

The bow stave section (Fig. 16, C) has a marked fracture where broken below the marks of the bow string. The stave is tapered above these marks and the end squared off. The find was recovered from the accumulation of vegetation exposed on the edge of the quarried out area above Square F4, by Mr. R. R. Inskeep of the University of Cape Town some time prior to the excavation. The fragment is 25 cm. in length and has a diameter of 1·2 cm. just above the tie marks. It presumably belonged to a medium to short bow.

Wooden points: Illustrated in the same figure (Fig. 16, A, B) are two pointed lengths of wood made on thin branches from which the bark has been removed at the points only. The points are smoothed and show no cut marks. The result may have been achieved by smoothing on a stone after initial shaping, and this would account for the minimal damage of the bark adjacent to the points.

A flat, pointed tool, 10 cm. long (Fig. 15, B) was recovered from Square F4. This piece of wood retains no bark and the working from the point extends back over more than half its length. The flattened point precludes its use for piercing. Several short pieces of reed were

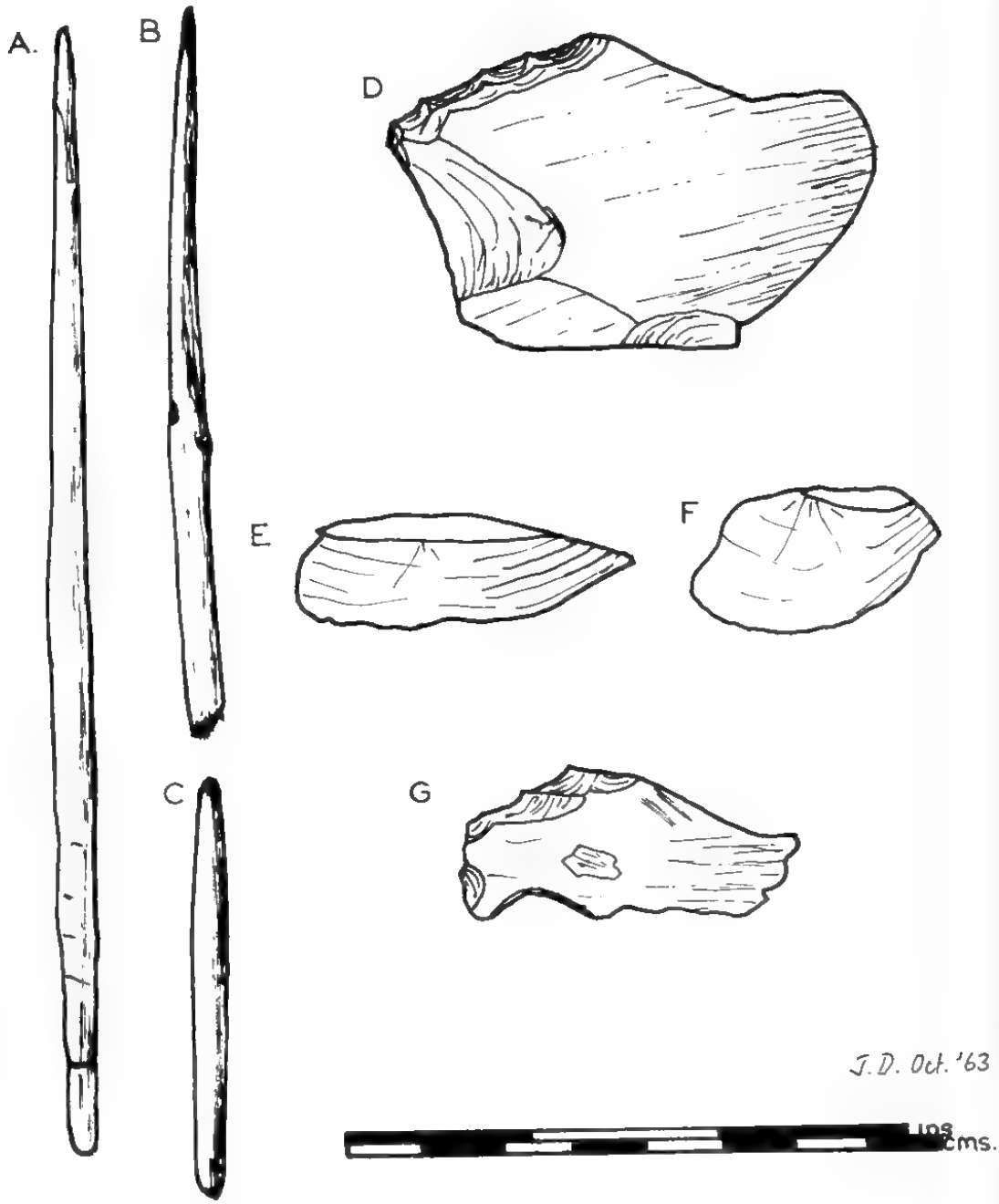


Fig. 15. Scott's Cave: A–C—Wooden implements; D and G—flaked bone tools; E and F—bone percussion flakes.

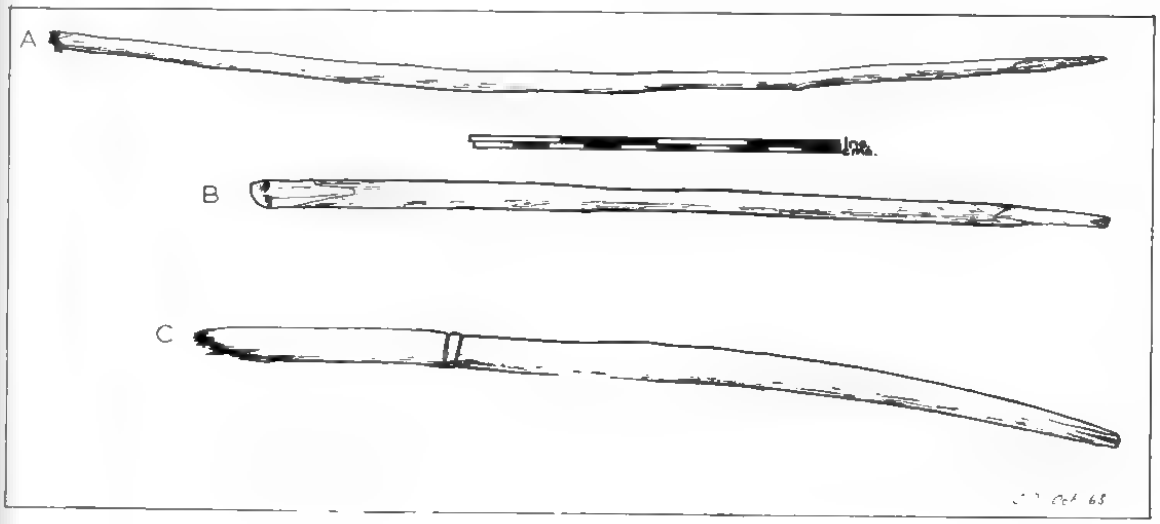


Fig. 16. Scott's Cave: A and B—two pointed wooden implements; C—a broken section of a bow stave.

recovered from the bedding sample in K5 analyzed by a botanist, and all show cut ends and restriction near these ends. These are possibly fragments of a mat and some tool with a flattened end may have been used in the manufacture of such mats.

Linkshaft: The short piece of wood, rounded at both ends (Fig. 15, C) from Square H5 is interpreted as being a linkshaft. It is very similar to bone or ivory linkshafts from other Eastern Cape sites.

The point (Fig. 15, A) is possibly a simple form of projectile head, fitting directly into the main reed shaft of an arrow without any linkshaft. The central and butt end of this point show cut marks clearly and has not been smoothed off as has been the point.

Four wooden pegs were recovered from the deposit. Two are illustrated in Fig. 17, A and B. In length they range between 13 and 7 cm. and are approximately 2cm. in diameter. All are split halves and, with one exception (Fig. 17, A) the inner surfaces show no wear. For this reason, the splitting may not have been intentional. The peg illustrated in Fig. 17, A, has a finer point which is blackened and may have been fire-hardened. The others have broader points, e.g. Fig. 17, B and K. The pegs have not been subjected to particularly heavy usage and the tops are not damaged to any large degree by hammering. One peg is actually exposed in the wall of the cutting between G6 and I6, and is standing vertically, but as this section has still to be excavated, it throws no light on the use of the pegs. It has been suggested (Clark, 1959, p. 200) that they were used in anchoring down skins being dried. The examples recovered from this excavation are far bigger than those from Melkhoutboom.

Three sections of fire sticks were excavated from Square 15; two are illustrated (Fig. 17, F). These represent the sections broken off the fire sticks when the hollow in which the drill rotates burns through. They are identical with an example from Spitzkop housed in the Albany Museum. The broken off end of what was possibly a fire drill was also recovered, but from a different square.

Three other wooden objects are illustrated in Fig. 17 (C, D, and E). The first shows reduction at one end, presumably for hafting, and may be a blunt-ended arrowhead. The second

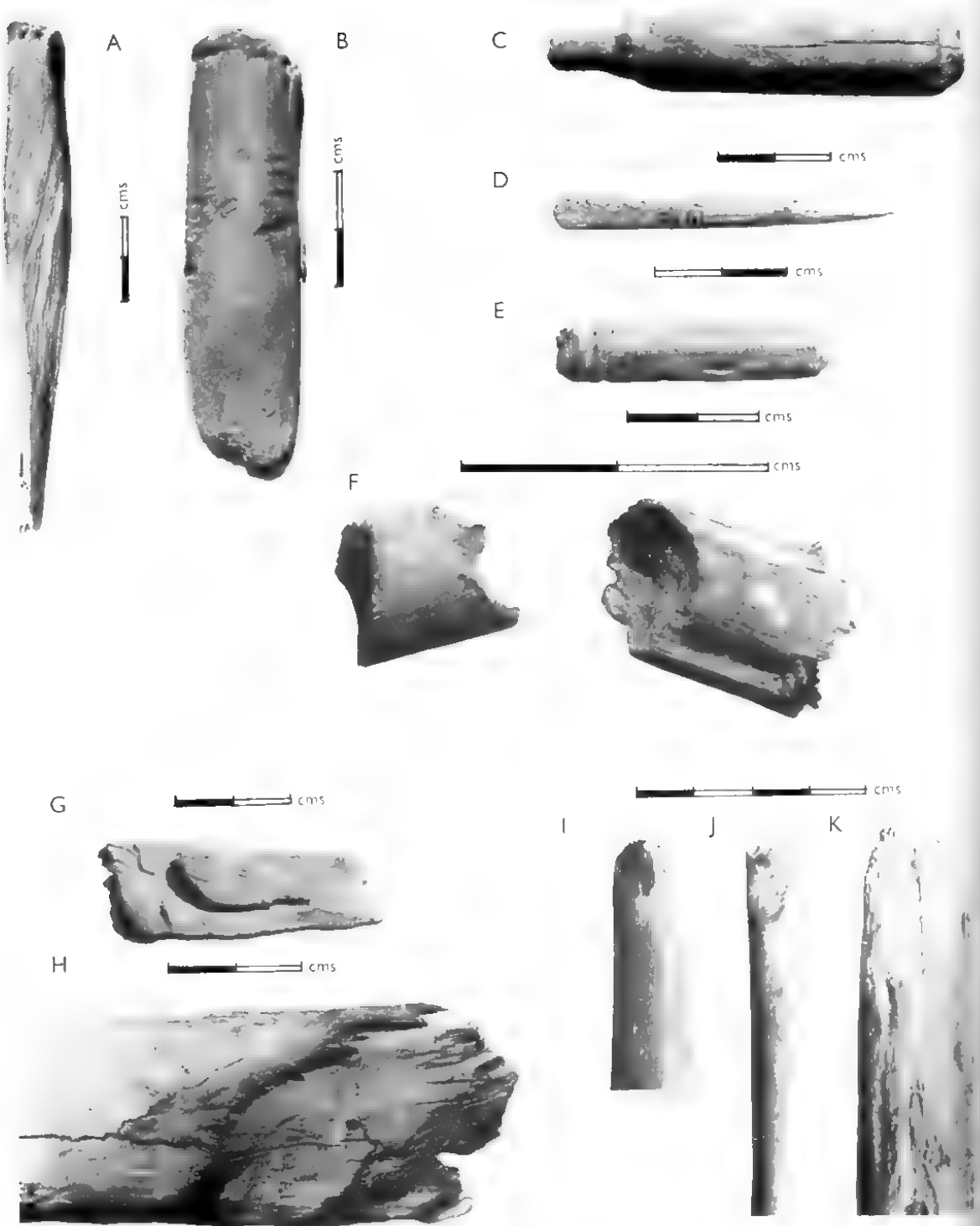


Fig. 17. Scott's Cave: A and B—wooden pegs; C possible blunt-ended arrowhead; D—wooden point; E—broken wooden tool with tie marks; F—fragment of fire sticks; G—sliver of wood; H—cut end of wild olive branch; I, J, K—worked ends of three tools.

is a well-finished short point with a slightly flattened base, and the third is split lengthwise and is broken through at a tie mark. It is obviously incomplete.

The techniques employed in working the wood are of some interest. Most pieces which are cut across the grain of the wood –such as the tops of the pegs—show that the end has been broken through after a ring of relatively shallow cut marks have been made around the stick. These cut marks are from a few mm. to 1 cm. in length and may have been made by a number of blows with a tool such as a stone flake. Deeper cut marks following the grain of the wood can be seen on the end of a long thick piece of wild olive wood (Fig. 17, H) found immediately on top of the deposit in Square J4, but sealed in by the overburden. Several slivers or spalls of wood, such as that illustrated from Square I5, spit 1 (Fig. 17, G) were found, indicating that some of the wood was worked inside the cave. The spalls and the marks on the olive wood have been produced by a thin sharp tool and seem more consistent with marks made by a metal object than with those made by the type of crude stone flakes found in the deposit. It is not impossible that some metal objects were traded by these Late Stone Age peoples and there is some evidence for trade contacts possibly with the early Iron Age peoples. It is not certain, however, that these cut marks are not due to the use of stone tools.

Shown in Fig. 17 (I, J and K) is the working at the ends of three tools. The first example (I) is one of two specimens with similar roughly worked steep points. The second is a cut piece of wood rather than a tool, but illustrates a clean and relatively shallow angled cut. The third (K) is the lower portion of a peg showing tapering to a broad point.

The identification of the wood employed for the various tools is included in the programme of analysis of the vegetation from the site.

Dating

Samples were collected for Carbon 14 dating and will be submitted to the Guggenheim Laboratory in Salisbury. The occurrence of well-fired pottery points to the site being occupied in the late phase of the Late Stone Age. The find of a pottery bead, although of probable local manufacture, suggests from its form that there was some contact, either direct or indirect, with Iron Age communities within the sphere of the bead trade. The information available on the early penetration of the Eastern Cape region by the Iron Age peoples (Wilson 1959) would date the site to the latter half of the present millennium. The possible smoking pipe, albeit not pottery, is also evidence for a relatively recent date and again suggests possible trade contact.

There are no trade objects of European origin from the site suggesting a date prior to effective European penetration and settlement of the region which may not have occurred until as recently as the late eighteenth century. There are thus some grounds for suggesting the date for the occupation of the site as between about 1500 and about 1790 A.D.

Habitation Patterns

The excavated area is too small a portion of the total area of the cave probably inhabited, to provide much evidence for the living pattern of the occupants. From the pattern of hearths and bedding in the excavated squares, there is the added problem that the site was probably inhabited for short periods on a number of occasions over a range of time of the order of 10's of years. Thus not only is it to be expected that activities on separate visits would have overlapped, but also that some disturbance of earlier occupational debris would have occurred.

The main features are: (1) the thick accumulations of wood ash in Squares H4, I4 and J4 which could only have resulted from the continual building of fires in this part, and (2) the position of the two main accumulation of vegetation, interpreted as bedding, at D5–F5 and in Squares K5 and J5 (Fig. 18). From the shell, shrivelled seed coats and charred bone in the ash deposits, it seems clear that these fires were not merely protection fires.

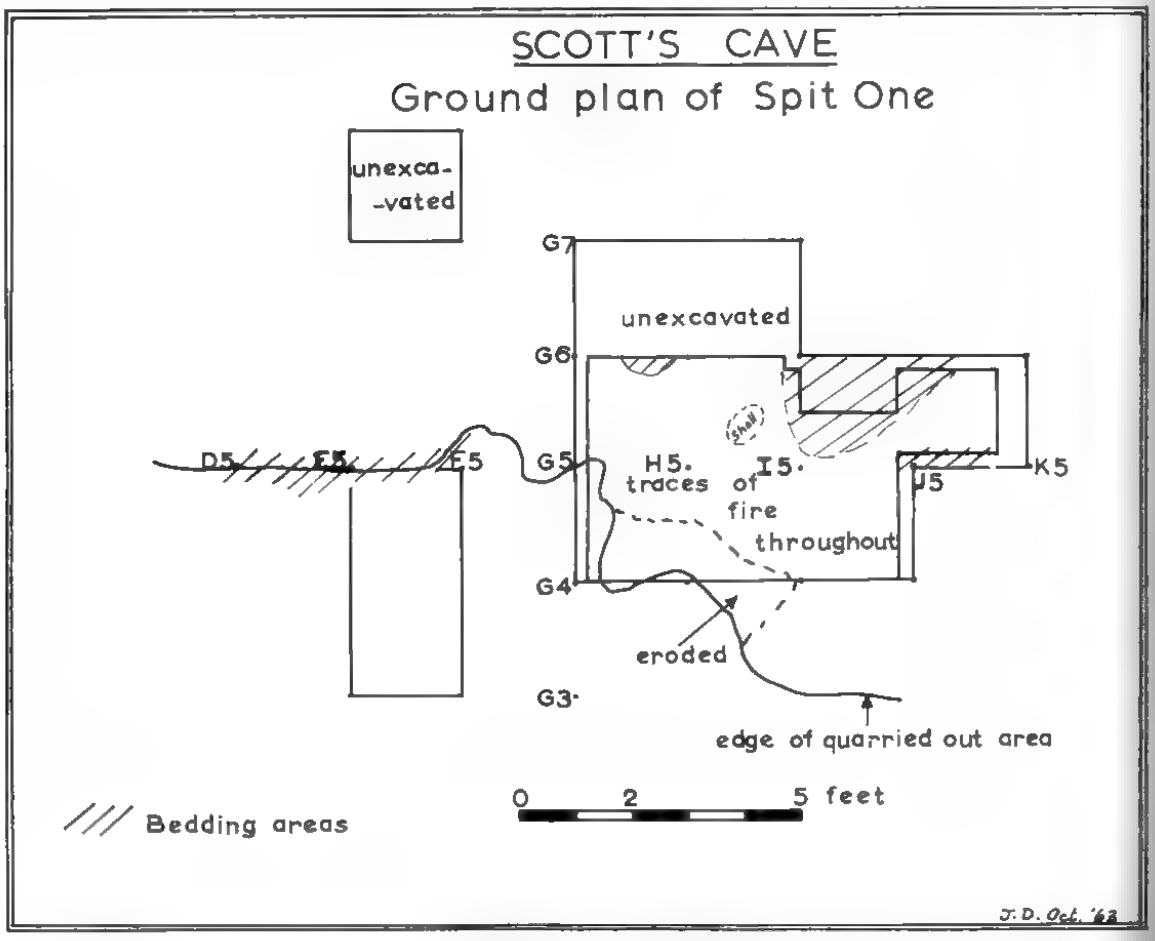


Fig. 18. Scott's Cave: Ground plan.

The two bedding accumulations differ in composition. That exposed on the edge of the quarried out area between D5 and F5 was not excavated, but appears to be made up of coarser vegetable material, twigs and saplings, as well as grasses which compose the major part of the second accumulation. It is possible that the former, resting as it does directly on the Enon Conglomerate blocks, was built from the base with coarse material and only the upper portion is composed predominantly of the softer grasses. The second accumulation (Fig. 4, A) rests on earlier deposits of soil and ash and vegetable remains, and therefore the base of coarser vegetation has not been necessary.

Other small concentrations of vegetable material, predominantly grasses, were noted and these could be the result of disturbances or the limits of accumulations not exposed in the excavation. In respect to the bedding, the form is not dissimilar to that found in the Late Stone Age site in the Erongo Mountains by Clark and Walton (1962).

Activities

At the level of culture of these Late Stone Age peoples. activities would be closely related to subsistence. Evidence for activities of a less basic nature and not directly related

to hunting or food gathering is limited to the occurrence of a number of pieces of ochre suggesting use for ornamentation, and to the occurrence of a number of beads, including six broken and unfinished eggshell beads in the same spit of Square J4.

Hunting:

The faunal remains from the deposit include large and small antelope, fish, carnivore, tortoise and rodent. The faunal sample is housed in the Albany Museum, but has not yet been studied in detail.

A proportion of the bone is charred and the bulk of the sample, which is very fragmented, probably represents the food remains of the Late Stone Age inhabitants and not the accumulations by some animal. Gnaw marks on the bones are not common, whereas bruising and cut marks, as well as percussion flaking can be seen on a number of examples. The finding of a broken bow stave points to the use of the bow in hunting. Pit traps, according to one local authority, were to be found in the kloof above the cave, but this was not confirmed. As at Oakhurst (Goodwin 1938), such traps may have been used by these Late Stone Age peoples in the Gamtoos Valley. The string or leather thongs such as found in the deposit may both have been used in the construction of traps or snares.

Collecting

There is abundant freshwater mussel shell scattered throughout the deposit. Over 90% is composed of *Unio caffer* the commonest freshwater mussel in the rivers of the region at the present time. An isolated heap of shell was found in the deposit in Squares I5 (Fig. 18). This probably constituted the remains of a single meal and comprised the equivalent of 42 mussels, represented by 84 unbroken halves, and a further 90 (calculated by weight) represented by broken pieces. The concentration and isolation of this small shell heap is the only basis for its interpretation as a single meal. The 132 mussels may suggest a group of perhaps 4–6 individuals having fed at this meal.

Samples of the well-preserved organic remains are at present being studied by Mr. M. Wells, Curator of the Albany Museum Herbarium, and the results will be published separately. Seeds and bulbs are included in the remains and it is hoped to obtain some indication of the range of edible plants collected. The preservation has been sufficiently good, for example, to identify and relate certain seeds, shrivelled seed coats and pods to an edible species of *Scotia*. It is not impossible that once the botanical evidence is collated, it may be possbile to suggest periods of year at which the site was occupied.

The quantities of seeds, seed pods, portions of bulbs and fresh-water mussel shells point to collecting—traditionally the woman's contribution to the economy—as playing an important part in the diet of these people.

Other Activities

There is direct evidence in the finds of leather for the dressing and sewing of skins with sinew. The largest fragment is possibly part of a garment and has been well worked. String and leather thongs were made obviously with some functional purpose in mind, and, as has been suggested, may have been used in traps, or else as a binding medium. The evidence is incomplete, but reed mats may also have been made.

The large number of potsherds found in the deposit suggests that potting was practised by the occupants, although there is no direct evidence for this in the excavated area. The 40 rim sherds excavated represent 36 different pots and Schofield (1948) has argued that at sites where such anomalous samples of pottery have been found, pottery sherd collecting, rather than pottery making, has been carried on. It is possible, however, that part-broken pots and individual sherds retained some functional value even to a people conversant with the

art of potting. The distribution of potsherds in the excavated area may in part be a measure of the disturbance that can result in a cave site with multiple occupation. Resinous substances still adhere to some of the sherds showing the use of these utensils for cooking foods and fatty substances.

Discussions

The site at Scott's Cave cannot be fully assessed at this stage with the limited area excavated, and the faunal and botanical samples still to be studied in detail. However, a résumé of the results and significance of the site can be made.

The well preserved organic remains are of two-fold importance. Firstly, the botanical analysis at present being undertaken will provide at least a list of plants, bulbs, seeds and grasses that have been selectively collected and which represent not only the edible vegetable foods, but also the raw materials for making mats, string, etc. Secondly, the finds have included an important sample of wooden tools. At many archaeological sites, wood-working has been inferred from the stone tool assemblage, but the wooden implements themselves have not survived and nothing can be said as to the form and the technique of manufacture of these implements. As a result of this paucity of wooden tools from archaeological contexts, it has also been difficult to assign some of the wooden implements from Scott's Cave to specific uses.

A feature of the lithic industry is the absence of formal tools. It is impossible to classify the industry within the framework of the Wilton and Smithfield cultures, and it can only be defined broadly as Late Stone Age. The absence of formal tools reflects rather the raw material used than an assemblage related to a specific activity, as there is some evidence in the finds of wood and bone tools and other objects that several activities were carried on in the excavated portion of the cave. The uniformity of the industry throughout, even with probable successive occupation and disturbance of earlier debris during occupation, suggests that it is not as un-representative a sample as may at first appear. The association of crude quartzite flakes with the microlithic elements of a developed Late Stone Age form is not unknown in the Eastern Cape, and a larger sample from Scott's Cave may indeed include such elements. At Melkhoutboom (Hewitt 1931) the lowest levels yield a sample made up of crude Witteberg quartzite flakes and in some of the succeeding levels, similar quartzite flakes were associated with formal Wilton tools made in silcrete. Hewitt concluded that the quartzite flake complement was an integral part of this Late Stone Age assemblage.

Formal tools are rare or absent in coastal midden deposits where their absence has generally been explained as a direct reflection of the economy. The economy of the Late Stone Age inhabitants of Scott's Cave shows a lesser emphasis on shell foods, and the more varied economy and the range of inferred activities cannot be invoked as an entirely satisfactory explanation for the absence of formal tools.

The inclusion of freshwater mussel shell in the Scott's Cave deposit is a feature not unusual in inland Late Stone Age sites in the Eastern Cape. There is little information on the quantities of these shells at sites such as Melkhoutboom and Wilton, but they appear to have been collected for food rather than ornaments and formed a part, albeit a minor part, of the diet. Sea shells drilled or bored obviously as ornaments do occur at a number of inland sites including Melkhoutboom and the inland freshwater mussel shell middens near Fish River Station in the Cradock district several hundred miles from the coast. Both in the practice of collecting shell food on an intensive scale as shown by the inland midden accumulations along the larger rivers, and the occurrence of sea shell ornaments at inland sites, there is good evidence for close contacts between the coastal and inland areas of the Eastern Cape during the Late Stone Age. Whether any distinct pattern of seasonal migration existed cannot be stated at this stage. It can however be reasonably assumed that the major river

valleys such as the Gamtoos, Sundays and the Fish, were the corridors linking the coastal belt with the inland areas. Scott's Cave, situated as it is on the edge of one such valley, would be expected to show features of both environments.

Acknowledgements

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M. COURTENAY-LATIMER

EAST LONDON MUSEUM.

Gray's Beaked Whale
Mesoplodon Grayi

(*Accepted 12th June, 1962*)

On the 9th January the Divisional Council called on us to identify a creature which they had been asked to bury on the beach at Gulu.

On arrival we found an 18′ 6″ Gray's Beaked Whale in a putrified condition. The whale was easily identified by its prominent beak, receding forehead, and two teeth projecting very slightly from side of the mouth, towards the back of the mouth, tail very flat and straight along outer edge instead of indented swallow shape, the colour dark slate grey throughout. Overall length of whale 18′ 6″, Girth 11′, Width of tail fin 3′ 6″.

The Beaked Whales derive their English name from the great development of the beak of the skull, which is long and narrow, and formed of extreme solid ivory-like bone.

The Gray's Beaked Whale was named by an Australian zoologist in honour of Dr. E. J. Gray, former Director of the British Museum.

Gray's Beaked Whale on Gulu Beach. (*Photo:* G. G. Smith)